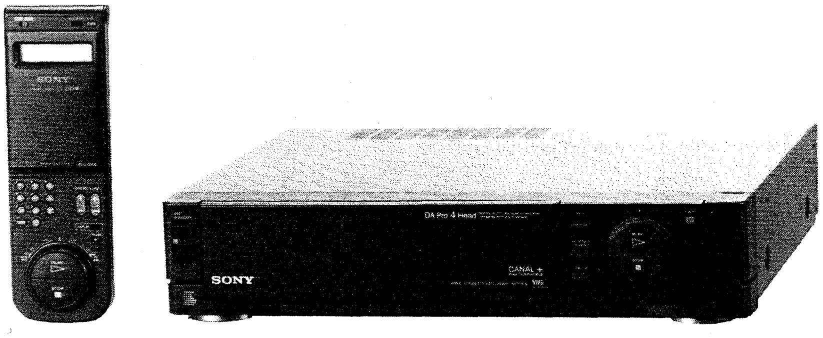
SLV-E5AE/AP/B/CP/EI/IT/VP
SLV-E6UV
RMT-AG1/V131A/V131C

SERVICE MANUAL

AEP Model
SLV-E5AE
Netherlands Model
SLV-E5AP
French Model
SLV-E5B
Spanish Model
SLV-E5CP
Irish Model
SLV-E5EI
Itarian Model
SLV-E5IT
Germany Model
SLV-E5VP
UK Model
SLV-E6UV

VHS
PAL NTSC



- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT II for MECHANICAL ADJUSTMENTS. (9-972-816-11)**

SPECIFICATIONS

System

Channel coverage	**E5 : AE, AP, CP, VP :** PAL B/G: VHF channels E2 to E12 CATV channels S01 to S03 S1 to S20 HYPER channels 2 to S41 UHF channels E21 to E69 **E5 : B, NC, E6UV :** PAL (1): UHF channels 21 to 69 **E5EI :** VHF channels A-J CATV channels S01-S03 CATV channels S1-S20 HYPER S21-S41 UHF channels E21-E69 **E5IT :** VHF channels A-H2 CATV channels S01-S03 CATV channels S1-S20 HYPER S21-S41 UHF channels 21-61
RF output signal	UHF channels 30 to 39
Aerial out	75 ohm asymmetrical aerial socket

Inputs and outputs

VIDEO IN	Phono jack (1) Inputs signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN	Phono jack (1) Input level: – 7.5 dBs (0 dBs = 0.775 Vrms) Input impedance: more than 47 kilohms
EURO-AV	21 pin Video input: pin 20 Audio input: pins 2 and 6 Video output: pin 19 Audio output: pins 1 and 3
AUDIO OUT	Phono jack (1) Rated output level: – 7.5 dBs at load Impedance: 47 kilohms Output impedance: less than 10 kilohms

— Continued on next page —

MICROFILM

VIDEO CASSETTE RECORDER

SONY®

General

Power requiremens	**E5 : AE, AP, B, CP, EI, IT, VP :** 220 – 240V AC, 50Hz **E6UV :** 240 V AC, 50 Hz
Power consumption	25 W
Operating temperature range	5℃ to 40℃ (41 °F to 104 °F)
Storage temperature range	– 20℃ to 60℃ (– 4 °F to 140 °F)
Dimensions	430 × 90 × 372 mm (w/h/d) (17 × $3^{5}/_{8}$ × $14^{3}/_{4}$ inches) including projecting parts and controls
Weight	5.2 kg (11 lb 7 oz)

Accessories supplied

Remote Commander (1)
R6 (size AA) batteries
(SLV-E6UV : 4)
Aerial lead (1)
Audio cable (1)
AC mains lead (1)
RF screwdrier (1)
Video Plus + Remote Commander
(SLV-E6UV only) (1)
Quick Start Manual (1)

Note

Design and specifications are subject to change without notice.

This appliance conforms with EEC Directive 87/308/EEC regarding interference suppression.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

TABLE OF CONTENTS

Section Title Page

SERVICE NOTE 4

1. GENERAL 6

2. DISASSEMBLY

2-1. Front Panel Assembly and Upper Case 24
2-2. MF-171, MF-172, MF-173 Boards 24
2-3. RP-163 Board and Mechanism Deck Block Assembly 25
2-4. Power Block 25
2-5. AU-144, GR-10, MA-144 Boards 26
2-6. Internal Views 27

3. DIAGRAMS

3-1. Circuit Boards Location 28
3-2. Overall Block Diagram 29
3-3. Video Block Diagram 33
3-4. System Control – Video Block Interface 37
3-5. System Control – Servo Peripheral Circuit Interface 39
3-6. System Control – Mechanism Block Interface 41
3-7. System Control – System Control Peripheral Circuit Interface 43
3-8. System Control – Audio Block Interface 43
3-9. System Control – Tuner Block Interface 44
3-10. System Control and RF Modulator – Input Selection Block Interface 44
3-11. Servo System Control – Microprocessor Pin Function (MA-144 Board IC203) 45
3-12. Servo, System Control Block Diagram 47
3-13. Audio Block Diagram 50
3-14. Timer, Tuner Mode Control Microcomputer Pin Function (MF-172 Board IC101 MB89905116) 53
3-15. Timer, Tuner Mode Control Block Diagram 57
3-16. Tuner Block Diagram 59
3-17. Power Block Diagram 62

4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. Frame Schematic Diagram 65
4-2. Printed Wiring Boards and Schematic Diagrams 69
  RP-163, GR-10 Boards 70
  MA-144 Board 78
  MA-144, CP-61, PD-37, VP-32 Boards 88
  MD-56, CA-41, CM-14 Boards 96
  AU-144 Board 101
  MF-171, MF-172, MF-173 Boards 103
  Power Block 111
4-3. Semiconductors 113

5. EXPLODED VIEWS

5-1. Front Panel and Cabinet Assemblies 114
5-2. Main Board and Power Block Assemblies 115
5-3. FL Cassette Compartment Assembly 116
5-4. Mechanism Chassis Assembly (1) 117
5-5. Mechanism Chassis Assembly (2) 118
5-6. Mechanism Chassis Assembly (3) 119

6. ELECTRICAL PARTS LIST 120

7. ELECTRICAL ADJUSTMENTS

7-1. Pre-Adjustment Preparations 136
  7-1-1. Instruments to be Used 136
  7-1-2. Connection 136
  7-1-3. Set-up Adjustment 137
  7-1-4. Alignment Tape (MH-2) 137
  7-1-5. Specified I/O Level and Impedance Input / output terminal 137
  7-1-6. Adjusting Sequence 137
7-2. Power Supply Check (Power Block) 137
7-3. System Control Check 138
  7-3-1. Clock Adjustment (MF-172 Board) 138
7-4. Servo System Adjustment 138
  7-4-1. Switching Position Adjustment (MA-144 Board) 138
7-5. Audio System Adjustments 138
  7-5-1. Normal Audio System Adjustment 138
7-6. Tuner System Adjustment 139
7-7. Parts Arrangement Diagram for Adjustments 139

SERVICE NOTE

1. RETURNING PINCH ROLLER, GUIDE ROLLER AND ELEVATOR CAM TO STOP CONDITION

1) Remove the bottom panel.
2) Turn the worm gear Ⓐ of the cam motor, located at lower of the MD, to the arrow direction Ⓑ by finger.

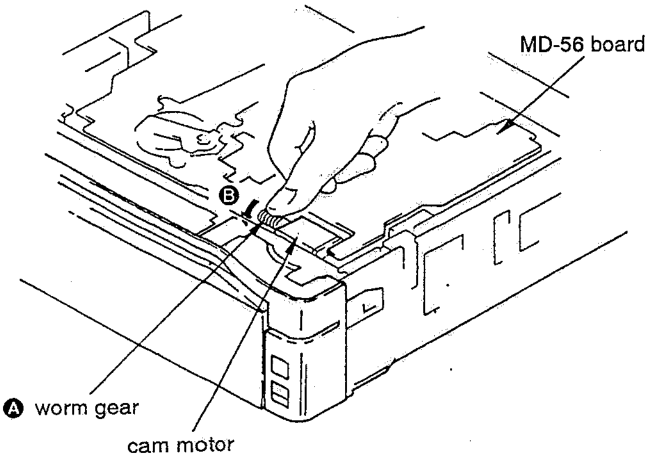

MD-56 board
Ⓑ
Ⓐ worm gear
cam motor

Fig. 1

2. WINDING TAPE TO CASSETTE HALF

Turn the fly wheel Ⓐ of the capstan motor to the arrow direction Ⓑ by finger, then the cassette tape will be wound to the cassette half.

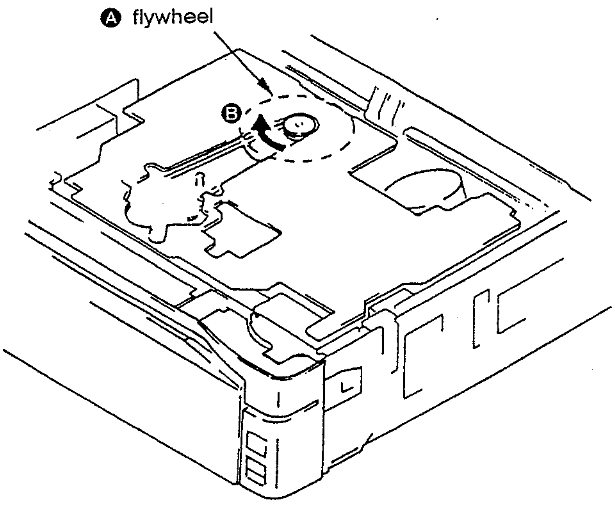


Fig. 2

3. TAKING OUT CASSETTE WHEN UNIT IS DEFECTIVE WITH CASSETTE IN

1) Remove the upper case.
2) Turn the worm gear Ⓐ of the FL cassette compartment motor to the arrow the direction Ⓑ by finger.

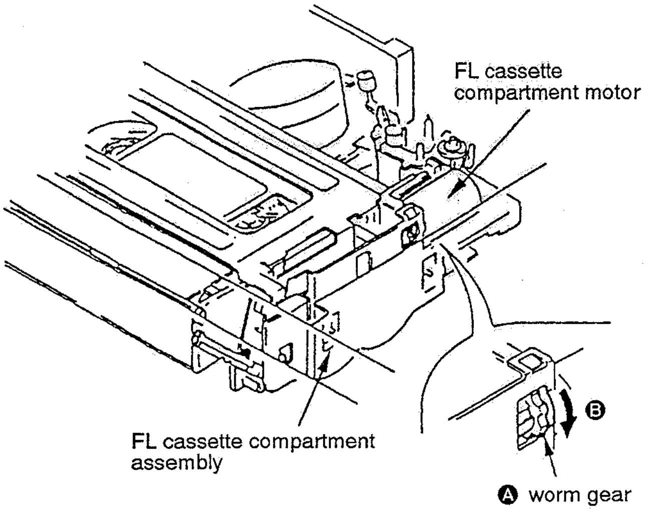

FL cassette compartment motor
FL cassette compartment assembly
Ⓑ
Ⓐ worm gear

Fig. 3

Note: When performing 1. to 3., be careful not to clog and damage the cassette tape.

4. UPPER DRUM REPLACEMENT

4-1. Removal of Upper Drum

1) Remove the screw ❶ (+P3 × 6) and take out the grounding shaft ❷. (See Fig. 4.)
2) Remove the two screws ❸ (+BVTP 3 × 10) and take out the RP-163 board ❹. (See Fig. 4.)
3) Completely remove the rotary upper drum board and desolder the soldering indicated by the arrows (12 points).
4) Remove two screws ❺ (PSW3 × 8) and take out the rotary upper drum in the arrow direction Ⓐ. (See Fig. 5.)
   If it is difficult, remove by shaking the rotary upper drum gradually.

Note: If the drum can not be removed, check whether the solders have been removed or not again.

4-2. Mounting Upper Drum

1) When inserting the rotary drum into the lower drum, be careful not to blur the contacting surface with fingerprint or the like.
2) Mount the rotary upper drum board by aligning marked ➡ with marked ⇛ of rotary transformer board (lower drum) so that the screw holes of both upper and lower drums match. (See Fig. 5.)
3) If it is difficult, mount the upper drum by shaking it gradually.
   Note: Be careful not to damage the head. Make sure that the upper drum is tightly inserted.
4) Tighten two screws ❺ (PSW3 × 8). (See Fig. 5.)
   Note: Temporary tighten two screws. After making sure that upper drum is tightly inserted, tighten the screws.
5) Solder 12 points on the board of the rotary upper drum.
6) Fix the grounding shaft ❷ using the screw ❶ (+P3 × 6) so that the protrusion of grounding shaft end contacts the center of the drum shaft.
   Note: When attaching the grounding shaft ❷, be careful not to apply force to the spring section of it.

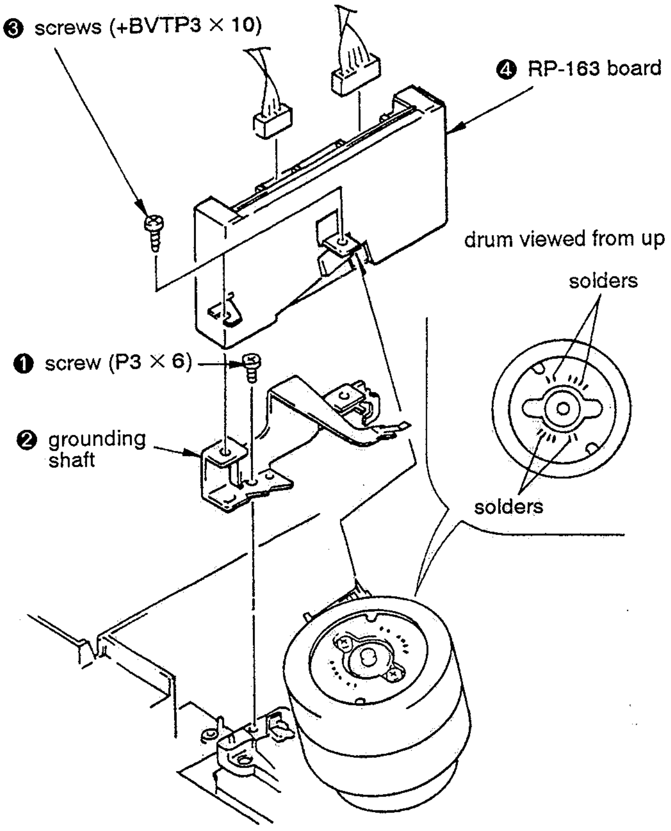

❸ screws (+BVTP3 × 10)
❹ RP-163 board
drum viewed from up
solders
❶ screw (P3 × 6)
❷ grounding shaft
solders

Fig. 4

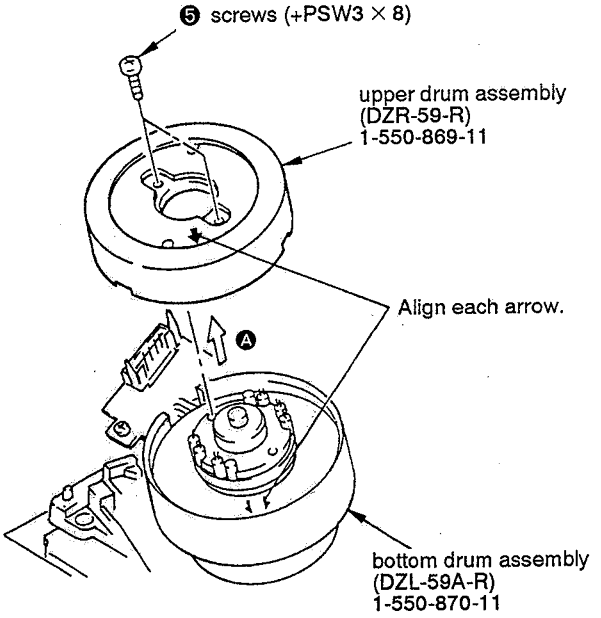

❺ screws (+PSW3 × 8)
upper drum assembly (DZR-59-R) 1-550-869-11
Align each arrow.
Ⓐ
bottom drum assembly (DZL-59A-R) 1-550-870-11

Fig. 5

This section is extracted from SLV-E6UV instruction manual.

SECTION 1
GENERAL

Features

Here are some of the features you'll enjoy with your video cassette recorder:

- High Quality (HQ*) picture technology that gives sharp, finely detailed pictures.
- Replay feature that, at a push of a button, replays in slow motion the last two seconds of a recorded scene.
- A long-range Remote Commander that lets you control the VCR functions.
- Easy-to-use on-screen menus for choosing many VCR options.
- An on-screen display that indicates elapsed time and remaining tape length for use in recording and playback.
- A timer to record up to eight TV programmes.
- Auto-tracking adjustment that automatically adjusts picture distortion.
- DUAL MODE SHUTTLE ring on the VCR and Remote Commander let you have quick access to a desired scene.
- OPC (Optimum Picture Control) function allows you to improve recording and playback quality by adjusting the system parameter automatically to the condition of the video heads and video tape.

* HQ
Video Cassette Recorders (VCR) with this marking incorporate VHS high-quality picture technology and are compatible with any video cassette recorder bearing the VHS mark.

Colour Systems of Your VCR

- This VCR is designed to record and playback using the PAL (I) colour system. Recording of video sources based on other colour systems cannot be guaranteed.
- Video tapes recorded with the NTSC colour system can be played back on this VCR.

How to Use This Manual

This manual is divided into the following six chapters: Introduction, Getting Started, Basic Operations, Advanced Operations, Editing, and Additional Information.

Chapter 1: Introduction

This chapter describes the principal features of the VCR.

Chapter 2: Getting Started

This chapter provides step-by-step information on how to set up your VCR.

Chapter 3: Basic Operations

This chapter provides information about the VCR's basic operations such as playing back a tape, recording a TV programme, timer recording, and quick-timer recording. If you are already familiar with the basic operations, see the chapter "Advanced Operations."

Chapter 4: Advanced Operations

This chapter describes various kinds of functions you can take advantage of when operating the VCR. Read this chapter after you become familiar with your VCR.

Chapter 5: Editing

This chapter describes how to edit a video tape onto or from your other VCR or video camera recorder.

Chapter 6: Additional Information

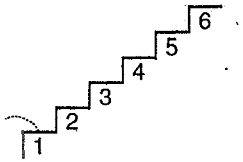
This chapter includes a troubleshooting section, specifications, and index. "Identifying Parts and Controls" is also helpful to overview your VCR. If you have any problems with setting up or operating your VCR, refer to the troubleshooting section first before calling your local Sony dealer.

Conventions of This Manual

This manual explains operations using the VCR Remote Commander. However, the buttons on the VCR with the same name or mark as those on the Remote Commander function exactly the same as those on the Remote Commander.

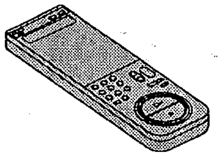
When you are reading through the manual, remember:
- Buttons and switches are shown in uppercase letters. Example: Press ► PLAY.
- Buttons and switches used during operation are shaded in the illustration.
- ⇦ indicates signal flow.

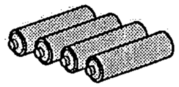
Step 1 Unpacking the VCR



Take the unit out of the box and unpack the accessories. Check that you have the following items.
- Remote Commander (1)
- R6 (size AA) batteries (4)
- Aerial lead (1)
- AC mains lead (1)
- RF screwdriver (1)
- Video Plus+ Remote Commander (1)
- Quick Start Manual (1)

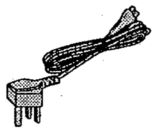
If you do not have all of these items, please contact your dealer.

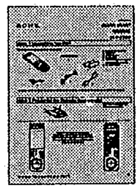

Remote Commander

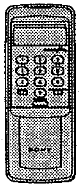

R6 (size AA) batteries

Aerial lead

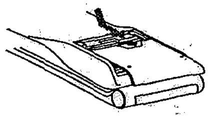
RF Screwdriver

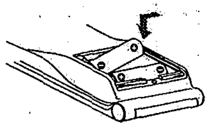

AC mains lead

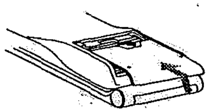

Quick Start Manual

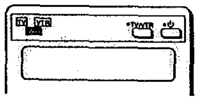

Video Plus+ Remote Commander

Step 2 Preparing the Remote Commander









Inserting Batteries

1 Slide open and remove the cover.

2 Insert two R6 (size AA) batteries so that the + and – polarities match the polarity diagrams inside the battery compartment.

3 Replace and close the cover.

Operating the VCR with the Remote Commander

Set the TV/VTR remote control selector at the top of the Remote Commander to "VTR."

If you are using a Sony TV

You can use the Remote Commander of this VCR to operate the TV. When doing this, slide the TV/VTR remote control selector to "TV." Buttons on the Remote Commander with a dot (•) on or beside them can be used to operate your TV. To operate the VCR, return the TV/VTR remote control selector to "VTR."

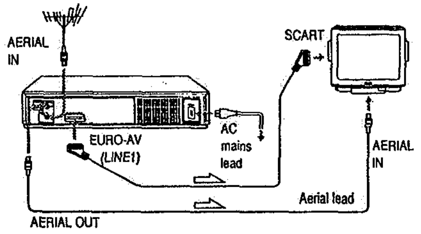
How to Use the Remote Commander

When you operate the VCR using the Remote Commander, point it at the remote sensor located on the VCR. For the location of the remote sensor, see "Identifying the Parts and Controls" on page 35.

Notes:
- Under normal operation, batteries last for approximately three months. However, if the Remote Commander will not be used for a long period, remove the batteries from the compartment to avoid possible damage from battery leakage.
- Do not use a new battery together with an old one.
- Do not use different types of batteries.

Step 3 Connecting the VCR

Whenever you view video tapes as well as TV programmes on your TV screen, make sure the connections to your VCR and TV are correct. The connection between the VCR and TV varies depending on the type of TV receiver and aerial you have.
First check the type of TV you have, and follow the appropriate instructions in this section.



1 Turn the VCR around so that you can see the rear panel.

2 Disconnect the aerial input lead from your TV and connect it to the socket marked AERIAL IN *on the rear of the VCR.*

3 Connect the aerial lead (supplied with the VCR) to the socket marked AERIAL OUT on the VCR and then plug it into the aerial input socket on your TV.

4 Check all connections to ensure they are firm.

5 Take the AC mains lead and plug it into the socket on the back of the VCR marked AC IN, then plug the other end into the wall socket.

Additional Connections

The connection using the supplied aerial lead is the basic connection for viewing and recording TV programmes. If your TV has a SCART connector, make additional connections for video viewing. Additional connections can improve picture quality.

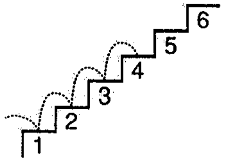
If your TV is equipped with a 21-pin SCART connector

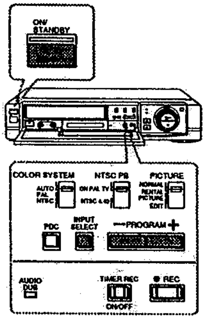
You can obtain a higher quality picture by connecting the EURO-AV of the VCR to the SCART connector of the TV. For this you need a VMC-2121HG cable (not supplied).

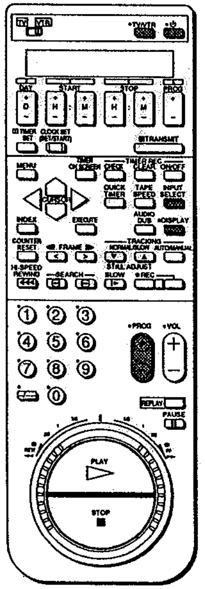
When using a SCART connector make sure to set the RF MODULATOR on the SET UP MENU to "OFF." (See page 28).

If you have connected the VCR to your TV using only the aerial sockets, you have to adjust one of the television programme positions to receive the VCR's playback signals.

Step 4 Tuning the TV to Your VCR




ON/STANDBY
COLOR SYSTEM
NTSC PB
PICTURE
AUTO
PAL
NTSC
ON PAL TV
NTSC 4.43
NORMAL
RENTAL
PICTURE
EDIT
PDC
INPUT SELECT
PROGRAM +
AUDIO DUB
TIMER REC
ON/OFF
● REC


TV
VTR
TV/VTR
MENU
EXECUTE
PLAY
STOP
PAUSE
PROG
VOL

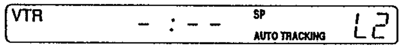
If you have connected the VCR to your TV using the EURO-AV cable, you can skip this step.

1 Turn on the TV.

2 Press ⏻ (ON/STANDBY) on the Remote Commander or ON/STANDBY on the front of the VCR so that the green light above the button lights up.

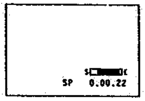
3 PressTV/VTR button to light VTR in the display window.

4 Press INPUT SELECT to light L2 (line 2) in the display window.
To use all of the buttons on the Remote Commander, open the cover.

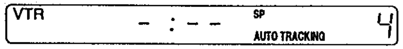

VTR
- : - -
SP
AUTO TRACKING
L2

5 On your TV select programme position preset on UHF channel 34. If channel 34 is already used to receive TV-Broadcast, see "If the picture shows interference" on page 11.

6 Press DISPLAY on the Remote Commander (See page 16) and tune the TV so that a blue screen with the Display (tape speed and tape counter) appears clearly on the TV screen.



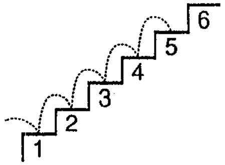
7 Press INPUT SELECT to light up the programme number in the display window.

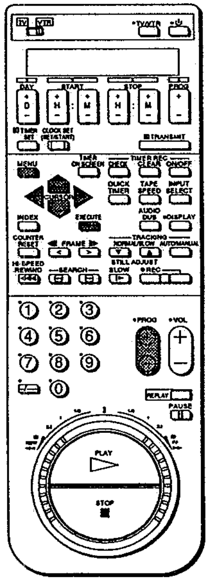

VTR
- : - -
SP
AUTO TRACKING
4

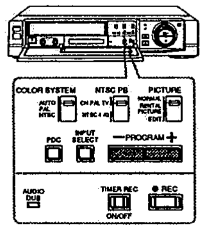
8 Press PROG +/– (PROGRAM +/–) to check to see if the TV screen changes to a different programme.

You have now tuned your TV to the VCR. When you play back a video cassette, set the TV to the programme position selected in step 5.

Step 5 Tuning Your VCR to Television Broadcasts



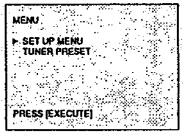

TV
VTR
TV/VTR
MENU
EXECUTE
PLAY
STOP
PAUSE
PROG
VOL


COLOR SYSTEM
NTSC PB
PICTURE
PDC
INPUT SELECT
PROGRAM +
AUDIO DUB
TIMER REC
ON/OFF
● REC

To watch and record TV programmes on your VCR, you must preset the active channels. You can preset the preferred channels using the Remote Commander and the TUNER PRESET display.

Presetting Desired Channels

1 Press MENU.
The main MENU appears on the TV screen.

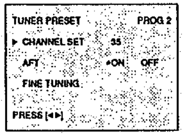


MENU

▶ SET UP MENU
TUNER PRESET

PRESS [EXECUTE]

2 Press ▲ or ▼ to move the cursor (▶) to TUNER PRESET, then press EXECUTE.
The TUNER PRESET menu appears on the TV screen.



TUNER PRESET PROG 2

▶ CHANNEL SET 35

AFT •ON OFF

FINE TUNING

PRESS [◀▶]

3 Press PROG +/– (PROGRAM +/–) to select the desired programme position.

4 Press ◀ or ▶ to scan the channels.
When the first channel received in your area is detected, the channel number stops changing and the picture for that channel appears for approximately 5 seconds, after which the blue screen appears. The above illustration shows the display when channel 35 is detected at programme position 2.

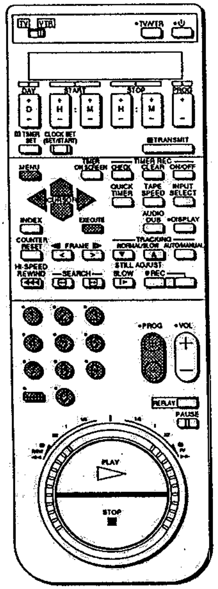
5 If the channel detected in step 4 is not the desired one, press ◀ or ▶ until the picture for the desired channel is detected.

Note
When you keep ◀ or ▶ pressed, UHF channels 21 to 69 are scanned.

6 To allocate other channels to the next programme position, repeat steps 3 to 5.

7 Press EXECUTE to store all the allocated channels and to return to the original TV screen.

(Continued)


TV
VTR
TV/VTR
DAY
START
STOP
PROG
TIMER SET
CLOCK SET
TRANSMIT
MENU
TIMER ON SCREEN
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
HI-SPEED REWIND
SEARCH
STILL ADJUST
SLOW
REC
PROG
VOL
REPLAY
PAUSE
PLAY
STOP

Allocating the Channels Directly

Enter the desired programme numbers using the programme number buttons. To enter single digits, press the desired number. To enter a two digit number such as 24, press the -/-- (10s digit) button, then press 2 and 4.

Disabling Unwanted Channels

If you want only the desired programme positions to appear when you select the programme position for normal recording, timer recording or quick-timer recording, you can do this by following the procedure below.

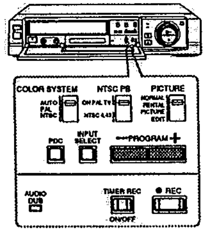
1 Press MENU, then press ▲ or ▼ to move the cursor (▶) to TUNER PRESET, then press EXECUTE.

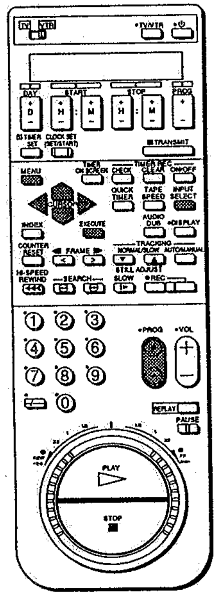
2 Press PROG+/– (PROGRAM +/–) until the programme position you want to disable appears in the PROG field of the TUNER PRESET menu.

3 Press the programme position number button "0" twice or keep pressing the cursor keys ◀ or ▶ until "0" is displayed in the CHANNEL SET field.

4 Repeat steps 2 and 3 to disable other programme positions.

5 Press EXECUTE.


COLOR SYSTEM
NTSC PB
PICTURE
AUTO
PAL
NTSC
ON PAL TV
NTSC 4.43
NORMAL
PICTURE EDIT
PDC
INPUT SELECT
PROGRAM +
AUDIO DUB
TIMER REC
REC
ON/OFF


TV
VTR
TV/VTR
DAY
START
STOP
PROG
MENU
EXECUTE
PROG
VOL
REPLAY
PAUSE
PLAY
STOP

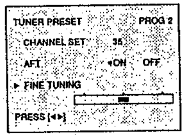
Fine Tuning

This VCR has been designed to tune in channels automatically. This function is called "Auto Fine Tuning" (AFT).
If the AFT does not produce a clear picture, you can also use the manual tuning function.

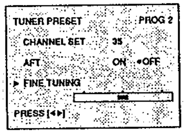
1 Press PROG +/– (PROGRAM +/–) to select the programme position for which you can't get a clear picture.

2 Call up the TUNER PRESET menu.
(See "Presetting Desired Channels" on page 9.)

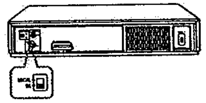
3 Press ▲ or ▼ to move the cursor (▶) to FINE TUNING.
The FINE TUNING meter appears.


TUNER PRESET PROG 2
CHANNEL SET 35
AFT •ON OFF
▶ FINE TUNING
PRESS ◀▶

4 Press ◀ or ▶ until you obtain the best possible picture.
Note that the dot (•) beside the "ON" of the AFT position automatically moves to "OFF."

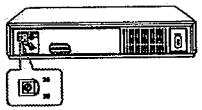

TUNER PRESET PROG 2
CHANNEL SET 35
AFT ON •OFF
▶ FINE TUNING
PRESS ◀▶

To improve the TV signal



The LOCAL/DX switch on the rear of the VCR is provided to strengthen or attenuate the reception signals. Normally set this switch to the DX position. If the reception signals are very strong, set it to the LOCAL position.

If the picture shows interference



1 Select a programme position on the TV between UHF channels 30 and 39, where the TV displays no picture and a rustling sound or no sound at all is heard.

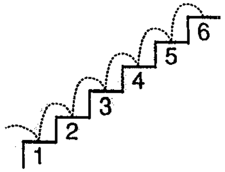
2 Press INPUT SELECT to light L2 (line 2) in the display window.

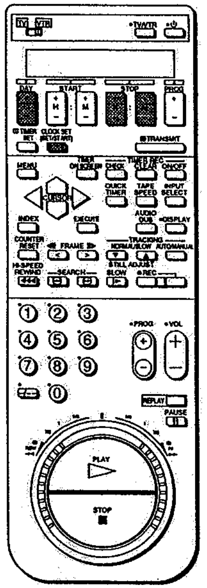
3 Turn the RF CHANNEL screw at the rear of the VCR with the supplied RF screwdriver, to a position where the TV clearly displays a blue screen with the Display (tape speed and tape counter indicators).

4 Press INPUT SELECT to light up the programme number in the display window.

5 Press PROG +/– (PROGRAM +/–) to check to see if the TV screen changes to a different programme.

Step 6 Setting the Clock

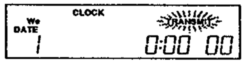




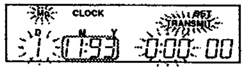
The last thing you need to do in getting started is to set the VCR clock on the Remote Commander.

Example: To set to 15:30, 27th November, 1993

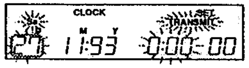
1 Press CLOCK SET.


CLOCK
We
DATE
1
TRANSMIT
0:00 00

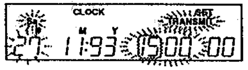
2 Press the D (DAY) button until 11 M (Month) 93 Y (Year) appears.
When the day display goes beyond 31, the month advances.


CLOCK
M Y
1 11:93
SET
TRANSMIT
0:00 00

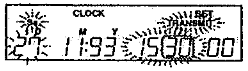
3 Press the + or – side on the D (DAY) button until 27 appears.
The day of the week is set automatically.

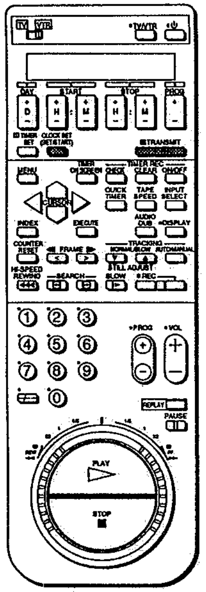

Sa
CLOCK
M Y
27 11:93
SET
TRANSMIT
0:00 00

4 Press the H (Hour) button in the STOP section to set the hour to 15.


Sa
CLOCK
M Y
27 11:93
SET
TRANSMIT
15:00 00

5 Press the M (Minute) button in the STOP section to set the minutes to 30.


Sa
CLOCK
M Y
27 11:93
SET
TRANSMIT
15:30 00

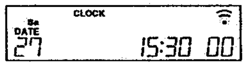


When -:-- lights up in the VCR display window
Any time power is interrupted for more than one hour, you will see -:-- lighted when power is restored. You will have to re-set the date and clock again.

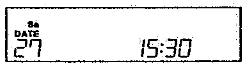
When a short beep sounds repeatedly
The VCR is in timer recording or quick timer recording or standby mode for timer recording, and the setting cannot be transmitted.

To correct the preset date and time
Open the Remote Commander cover and repeat steps 1 to 7.

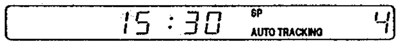
6 Point the Remote Commander at the VCR and press TRANSMIT.
When time and date are transmitted successfully, a beep sounds.


CLOCK
Sa
DATE
27
15:30 00

7 Check the display window of the VCR to see if the display shows the current time, and press CLOCK SET.

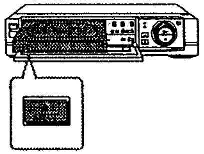

Sa
DATE
27
15:30

(On the Remote Commander)


15 : 30
SP
AUTO TRACKING
4

(On the VCR)

Playback



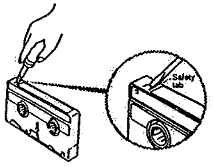
Inserting a Video Cassette

1 Open the drop down panel.

2 Gently press the centre of the front side of the cassette with the arrow indication facing upwards until the mechanism draws it into the compartment.
When the cassette has been loaded, the cassette indicator ▭ lights in the display window, the VCR turns on, and the time and date clock switches to the tape counter automatically.

Ejecting a Video Cassette

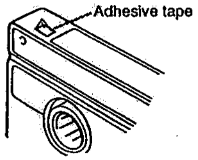
Press ≜ EJECT on the VCR.
The cassette indicator ▭ light in the display window goes out. When the cassette is ejected the tape counter switches to the time and date clock automatically.
You can eject the cassette even when the power is off, so long as the AC power cord is plugged into the wall outlet.

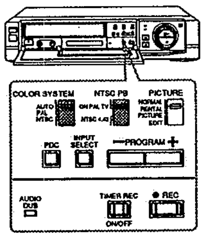


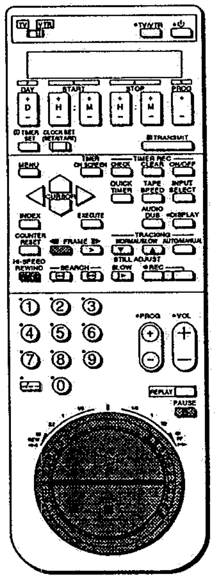
Protecting your cassette against accidental erasure

Cassettes have a safety tab to protect against accidental recording.
Break off the safety tab with a screwdriver or other tool.
If the safety tab is removed, the cassette is ejected when you try to record on it.

To record on a cassette with the safety tab broken off
Simply cover the tab hole with adhesive tape.


Adhesive tape


COLOR SYSTEM
AUTO
PAL
NTSC
NTSC PB
ON PAL TV
NTSC 4.43
PICTURE
NORMAL
RENTAL PICTURE
EDIT
PDC
INPUT SELECT
— PROGRAM +
AUDIO DUB
TIMER REC
ON/OFF
● REC


TV
VTR
TV/VTR
DAY
START
STOP
PROG
D
H
M
TIMER SET
CLOCK SET (SET/START)
TRANSMIT
MENU
TIMER ON SCREEN
TIMER REC
CHECK
CLEAR
ON/OFF
CURSOR
QUICK TIMER
TAPE SPEED
INPUT SELECT
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
NORMAL/SLOW
AUTO/MANUAL
STILL ADJUST
HI-SPEED REWIND
SEARCH
SLOW
● REC
PROG
VOL
REPLAY
PAUSE

Playing Back a Cassette

This VCR automatically detects the tape speed (SP or LP for PAL system video tapes and SP or EP for NTSC system video tapes) with which a video cassette was recorded. If you insert a cassette with its safety tab removed, playback starts automatically.

Note: The OPC function operates automatically during playback if the OPC button/indicator is on and lit. For details, see page 31.

1 Insert a cassette.
The VCR turns on automatically.

2 Turn on the TV.
If you have made only an aerial connection, switch the TV to the programme position you set the VCR to in "Step 4 Tuning the TV to your VCR" on page 8.

3 Set the COLOR SYSTEM switch on the VCR to conform to the colour system of the cassette to be played back. Normally this switch should be set to AUTO. If streaks appear when playing back a video tape, select the colour system format that matches the format the video tape was recorded with to obtain a better picture. After you are finished, return the COLOR SYSTEM switch to the AUTO position.

Colour system	Switch position
PAL	PAL
NTSC	NTSC

4 If you are playing back an NTSC-recorded tape, set the NTSC PB switch to conform to the TV system you are using. See page 17.

5 Press ► PLAY.
When the tape reaches the end, the VCR automatically rewinds the tape to the beginning (auto rewind).

To stop playback
Press ■ STOP.

To stop playback for a moment
Press II PAUSE.
Press II PAUSE again or press ► PLAY to resume playback.

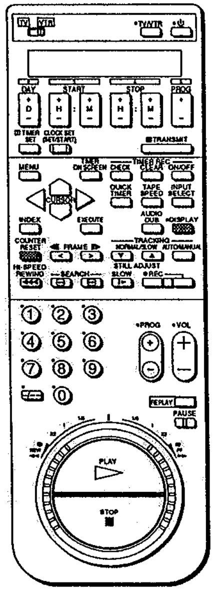
To fast forward the tape
Press ■ STOP, then turn the DUAL MODE SHUTTLE ring clockwise to FF ►►

To rewind the tape
Press ■ STOP, then turn the DUAL MODE SHUTTLE ring counterclockwise to ◄◄ REW.
These operations will continue even if you release the ring.

To rewind the tape at a higher speed
Press ◄◄◄ HI-SPEED REWIND.

To automatically start playback after rewinding or high-speed rewinding the tape
Using the VCR only, press ► PLAY while pressing ◄◄◄ HI-SPEED REWIND or using the DUAL MODE SHUTTLE ring.

If you want to view the tape in reverse mode
Press ◄II FRAME (reverse) during playback.

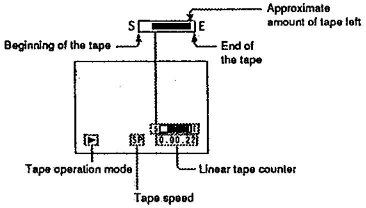

TV
VTR
TV/VTR
DAY
START
STOP
PROG
TRANSMIT
MENU
CURSOR
EXECUTE
DISPLAY
PROG
VOL
REPLAY
PAUSE
PLAY
STOP

Using the Display

The Display is useful for immediately determining tape speed, tape operation mode, amount of tape remaining, and tape count. To use the Display, press DISPLAY on the Remote Commander. The Display does not appear when an NTSC recorded tape is being played back.

The Display with tape counter

When you press the DISPLAY button, the amount of the tape remaining and the linear tape count are displayed.


S
E
Approximate amount of tape left
Beginning of the tape
End of the tape
SP
0.00.22
Tape operation mode
Linear tape counter
Tape speed

Note: Tape operation mode, and tape speed are displayed when you make change to them.

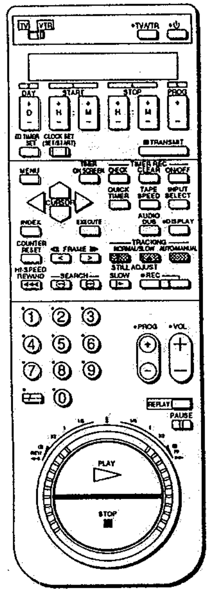
To turn off the Display

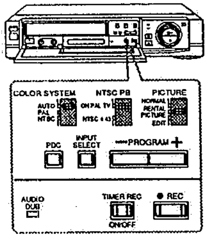
Press DISPLAY.

Note: Tape operation mode, and tape speed are displayed even when the DISPLAY is turned off.

Resetting the Tape Counter

The tape counter in the display window helps you to locate a certain scene after playback. Press COUNTER RESET on the Remote Commander to set the counter to the "0H00M00S" (counter zero position before playing back the tape). The tape counter is automatically reset to zero whenever a cassette is inserted. The VCR keeps counting the length of the tape being played back. Note, however, that the tape counter does not count the positions without video signals recorded.


TV
VTR
TV/VTR
DAY
START
STOP
PROG
TRANSMIT
MENU
CURSOR
EXECUTE
DISPLAY
PROG
VOL
REPLAY
PAUSE
PLAY
STOP


COLOR SYSTEM
AUTO
PAL
NTSC
NTSC PB
ON PAL TV
NTSC 4.43
PICTURE
NORMAL
RENTAL PICTURE
EDIT
PDC
INPUT SELECT
– PROGRAM +
AUDIO DUB
TIMER REC
ON/OFF
● REC

Enhancing Picture Quality

Automatic Tracking Adjustment

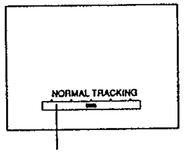
The AUTO TRACKING indicator in the display window flashes while the VCR is searching for the best tracking condition and lights steadily when the best possible playback picture is obtained.
If the VCR cannot find the best tracking condition, adjust the tracking manually.

AUTO TRACKING

Flashes.

Manual Tracking Adjustment

Press ▼/▲ on the TRACKING NORMAL/SLOW (STILL/ADJUST) buttons to get the best picture. The tracking meter appears on the screen. The distortion should disappear as you press one of the two buttons.
If you cannot get a clear picture by adjusting the tracking manually, press the AUTO/MANUAL button to return to automatic tracking.


NORMAL TRACKING

Tracking meter

Reducing Streaks and/or Snow

Select RENTAL PICTURE on the PICTURE switch on the VCR.

Auto Head Cleaner

The auto head cleaner built into the VCR automatically cleans the video heads when a cassette is loaded or unloaded. If the effect of head cleaning is not sufficient even after a cassette has been loaded/unloaded several times, clean the heads using the Sony V-25CL video head cleaning cassette. For details on head cleaning, see page 41.

NTSC-recorded Tapes

You can play back a cassette recorded in either the NTSC 4.43 or NTSC 3.58 video system on a PAL system television set.

Set the NTSC PB switch according to the type of TV you have.

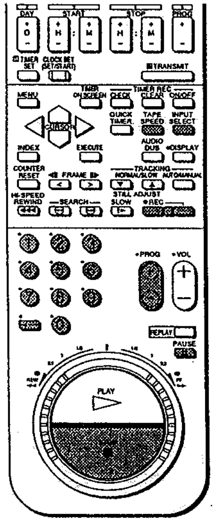
PAL system TV ➡ set the NTSC PB switch to ON PAL TV.
NTSC 4.43 system ➡ set the NTSC PB switch to NTSC 4.43.

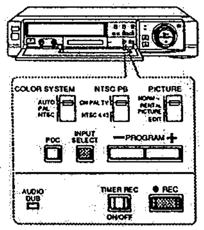
Set the COLOR SYSTEM switch to AUTO, or if the picture is unclear, to NTSC.

The following will occur during playback of an NTSC-recorded tape

- The display will not appear even if you press DISPLAY.
- Depending on the TV you are using, the following may occur separately or in combination:
  - the picture becomes black and white
  - the picture shakes
  - no picture appears on the screen
  - black streaks appear horizontally on the screen
  - the colour density increases or decreases
  - noise occurs in the EP mode.
- If a tape has portions recorded in both the PAL and NTSC video systems, the tape counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.

Recording TV Programmes


DAY
START
STOP
PROG
TIMER SET
CLOCK SET (SET/START)
TRANSMIT
MENU
TIMER ON SCREEN
TIMER REC
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
NORMAL/SLOW
AUTO/MANUAL
STILL ADJUST
HI-SPEED REWIND
SEARCH
SLOW
● REC
PROG
VOL
REPLAY
PAUSE
PLAY


COLOR SYSTEM
AUTO
PAL
NTSC
NTSC PB
ON PAL TV
NTSC 4.43
PICTURE
NORMAL
RENTAL PICTURE
EDIT
PDC
INPUT SELECT
— PROGRAM +
AUDIO DUB
TIMER REC
ON/OFF
● REC

If the tape is ejected when the REC button is pressed
The tab on the cassette is out. Use another cassette with its safety tab in place.

If you are using a Sony TV
You can use the Remote Commander of this VCR to operate the TV.
When doing this, slide the TV/VTR remote control selector at the top of the Remote Commander to "TV." To operate the VCR, return the TV/VTR remote control selector to "VTR."

You can record TV programmes in one of three ways:

- While watching the programme (this page)
- While not watching the TV at all (page 19)
- While watching another programme (page 19)

Before recording, check to see that all connections have been made correctly.

Note: The OPC function operates automatically during recording if the OPC button/indicator is on and lit. For details, see page 31.

Recording while Watching the TV Programme

1 Turn on the TV.
If you have made the VCR/TV connection via the aerial socket, select the programme position for the VCR on the TV.

2 Insert a cassette with a safety tab into the compartment.
The VCR turns on automatically.

3 Press INPUT SELECT to light up the programme number in the display window.

4 Press TAPE SPEED to select the recording tape speed.
The selected tape speed lights up in the display window.

5 Press PROG +/– (PROGRAM +/–) to select the desired programme position.
You can also use the numbered buttons on the Remote Commander. For 2 digit numbers first press -/-- and then the 2 numbers.

6 Press the two ● REC buttons on the Remote Commander at the same time.
When you control from the VCR, press ● REC only. The REC indicator lights up and recording begins. The Display appears on the TV screen. The Display is not recorded on the tape.
When the tape reaches the end, the VCR rewinds the tape automatically to the beginning.

To stop recording

Press ■ STOP.

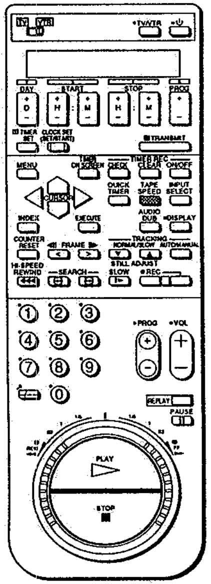
To pause recording

You can stop recording an unwanted scene and resume recording smoothly.

1 Press II PAUSE when an unwanted scene appears.
Recording stops and the VCR enters the recording pause mode.

2 Press II PAUSE again at the desired point to release the pause mode.
Recording resumes form the point set in step 1.

When the recording pause mode lasts for approximately 5 minutes, the VCR enters the stop mode.


TV VTR
TV/VTR
DAY
START
STOP
PROG
TRANSMIT
MENU
CURSOR
QUICK TIMER
TAPE SPEED
INPUT SELECT
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
HI-SPEED REWIND
SEARCH
SLOW
● REC
PROG
VOL
REPLAY
PAUSE
PLAY
STOP

Recording with the TV Off

Turn off the power of the TV or monitor.
There is no interference with the recording.

Recording while Watching Another Programme

Select the programme position you want to watch on the TV.

Note: If the VTR indicator in the display window is lit, press TV/VTR.

If you use a colour monitor

You cannot watch another programme during recording unless the monitor has an internal TV tuner.

Maximum Recording Time of a Cassette

Recording in either the SP or LP modes for the PAL system and playback in the SP or EP modes for the NTSC system is possible with this VCR. When recording, select the desired tape speed (SP, LP or EP) using the TAPE SPEED button. During playback, the VCR automatically detects the recording format, and then plays back the cassette in the appropriate mode.
A tape recorded in the EP mode runs three times as slowly, and a tape recorded in the LP mode runs twice as slowly, as a tape recorded in the SP mode. Refer to the charts below for the recording/playback time available in each mode.

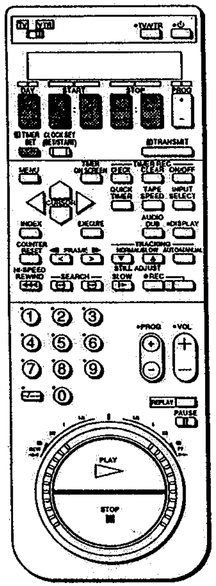
PAL colour system

Cassette Tape	Recording/Playback time	
	SP mode	LP mode
E-240	4 hrs.	8 hrs.
E-180	3 hrs.	6 hrs.
E-120	2 hrs.	4 hrs.
E-60	1 hr.	2 hrs.

NTSC colour system

Cassette Tape	Playback time	
	SP mode	EP mode
T-160	2 hrs. 40 min.	8 hrs.
T-120	2 hrs.	6 hrs.
T-60	1 hr.	3 hrs.
T-30	30 min.	1 hr. 30 min.

Timer Recording



The Timer Recording function allows you to preset your VCR to record up to eight programmes within a one-month period.

Before you begin

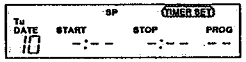
- Check to make sure that the time and date clock is set correctly. (See "Setting the Clock" on page 12.)
- Check to see that the video cassette is long enough to record all the programmes.
- Check to make sure that the safety tab of the video cassette has not been removed. If you insert a cassette without a safety tab and try to set the timer, a short beep sound is heard repeatedly and the cassette is automatically ejected from the VCR.

Setting the Timer

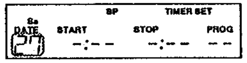
Example

Here's how to record a programme broadcast on channel 26 from 20:00 to 21:55 on Saturday, 27th November 1993.

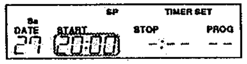
1 Press TIMER SET.


SP
TIMER SET
Tu
DATE
START
STOP
PROG
10
-:--
-:--
--

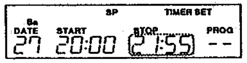
2 Press the + or – side on the D (DAY) button until 27 appears.
The day of the week is set automatically.

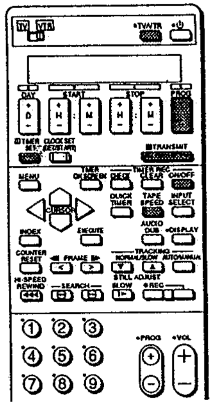

SP
TIMER SET
Sa
DATE
START
STOP
PROG
27
-:--
-:--
--

3 Press the H (Hour) button and then the M (Minute) button in the START section to set the recording start time.


SP
TIMER SET
Sa
DATE
START
STOP
PROG
27
20:00
-:--
--

4 Press the H (Hour) button and then the M (Minute) button in the STOP section to set the recording end time.


SP
TIMER SET
Sa
DATE
START
STOP
PROG
27
20:00
21:55
--

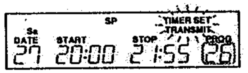


If a short beep tone sounds repeatedly when you press TRANSMIT
A short beep sounds repeatedly when the VCR fails to receive the command transmitted from the Remote Commander.
Press TRANSMIT repeatedly, and if the beep sound persists, check the following:

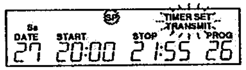
- No cassette is inserted.
- You have made an illogical operation on the Remote Commander.
- You have attempted to transmit data when the VCR is in the timer recording mode.
- You have already made eight timer settings.
- The tape is at its end.

If the power is interrupted while in the timer recording standby/timer recording mode for more than one hour
In the recording standby mode, timer settings are cleared. Reset the settings from the beginning.
In the timer recording mode, the recording stops and the VCR turns off.
If the power interruption lasts for less than one hour, the VCR returns to the original mode when the power is supplied again.

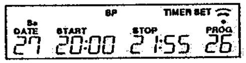
5 Press PROG +/– to select the desired programme position for recording.


SP
TIMER SET
TRANSMIT
Sa
DATE
START
STOP
PROG
27
20:00
21:55
26

6 Press the TAPE SPEED button to select the desired tape speed for recording.

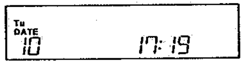

SP
TIMER SET
TRANSMIT
Sa
DATE
START
STOP
PROG
27
20:00
21:55
26

7 Point the Commander at the VCR and press TRANSMIT.
When a beep tone sounds, the VCR is ready for timer recording.


SP
TIMER SET
Sa
DATE
START
STOP
PROG
27
20:00
21:55
26

8 To set other programmes repeat steps 2 to 7.

9 Press TIMER SET.
The current time appears on the LCD display.

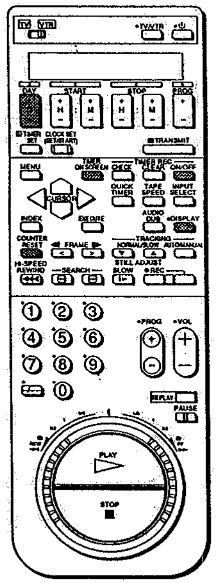

Tu
DATE
10
17:19

The VCR turns on automatically and starts recording at the preset start time, and goes off at the preset stop time.

To use the VCR before timer recording starts

Press TIMER REC ON/OFF, then turn on the power of the VCR, and press TV/VTR button. After using the VCR, remember to press TIMER REC ON/OFF again.

Indicator	Setting
24.11 WED	On 24th November
SUN–SAT	Every day
MON–SAT	Every day except Sunday
MON–FRI	Every day except Saturday and Sunday
Every SAT	Every Saturday
Every MON	Every Monday
Every SUN	Every Sunday
23.12 FRI	1 month later
25.11 THU	On 25th November


TV
VTR
TV/VTR
DAY
START
STOP
PROG
TRANSMIT
MENU
TIMER ON SCREEN
CHECK
CLEAR
TIMER REC ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
HI-SPEED REWIND
SEARCH
STILL ADJUST
SLOW
REC
PROG
VOL
REPLAY
PAUSE
PLAY
STOP

Daily/Weekly Recording

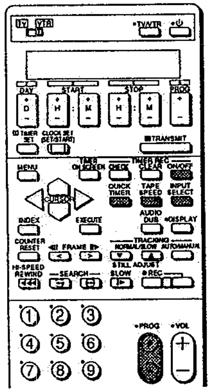
You can preset your VCR for daily or weekly recording. Daily recording records the same programme every day of the week while weekly recording records the same programme on the same day, every week.

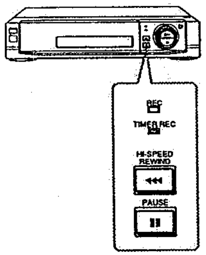
Press the - (minus) side of the D (DAY) button repeatedly until the desired indicator appears in step 2 of "Setting the Timer" on page 20.
The indication in the LCD display changes as shown on the left.

To stop timer recording
Press TIMER REC (ON/OFF).

You can use the following buttons during timer recording

TIMER REC (ON/OFF)	To stop timer recording
COUNTER RESET	To reset the counter to "0H00M00S"
DISPLAY	To display data screen information
TIMER ON SCREEN	To check the timer settings


TV
VTR
TV/VTR
DAY
START
STOP
PROG
TRANSMIT
MENU
TIMER ON SCREEN
CHECK
CLEAR
TIMER REC ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
HI-SPEED REWIND
SEARCH
STILL ADJUST
SLOW
REC
PROG
VOL


REC
TIMER REC
HI-SPEED REWIND
PAUSE

Notes:
- For buttons you can use during quick-timer recording, see "You can use the following buttons during timer recording" on page 22.
- If a power interruption occurs during quick-timer recording, recording stops and your VCR shuts off. If power is restored within one hour, and it is before the recording end time, recording starts again from that point. If the interruption lasts for more than one hour, any presettings are erased and you must reset the time and date for your programmes. Note that the tape counter returns to "0H00M00S," after a power interruption.

Quick-Timer Recording

This function allows you to preset your VCR to record for a specified amount of time from now without having to set the recording start time. You can set the recording duration in increments of 30 minutes, for up to nine hours. Note, however, that it provides only an approximate setting for the programme you wish to record.
If you have not set the time and date clock correctly, quick-timer recording cannot be done.

1. Insert a cassette with a safety tab in place.
2. Press INPUT SELECT to light up the programme position number indicator in the display window.
3. Press TAPE SPEED to select the tape speed, SP or LP for the PAL system.
4. Press QUICK TIMER on the Remote Commander.
   If a cassette with the safety tab removed has been inserted, the VCR ejects the cassette.
5. Press PROG +/– (PROGRAM +/–) to select the programme for recording while the programme number is flashing in the display window.
6. Press QUICK TIMER within 30 seconds after selecting the programme to start recording.
   The TIMER REC indicator lights up on the VCR.

   If you don't press QUICK TIMER within 30 seconds after selecting the programme position, the VCR quits the quick-timer mode.
7. Press QUICK TIMER to determine the recording duration. Each press on the button increases the recording duration in increments of 30 minutes as shown below.

   →0:00 →0:30 →1:00 →······ →8:30 →9:00

Turn off the TV, and the VCR continues recording.
The recording duration decreases minute by minute until 0:00 appears, then the VCR turns off automatically.

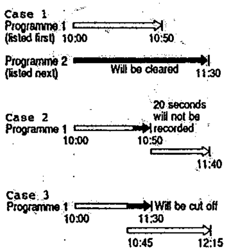
To stop quick-timer recording
Press TIMER REC (ON/OFF).

To extend the recording duration during recording
Press QUICK TIMER the desired number of times. One press on the button increases the duration by 30 minutes.

If the VCR is in the standby mode for recording
Press TIMER REC (ON/OFF) to turn off the TIMER REC indicator on the VCR and do steps 3 to 7.

Overlapping Timer Recordings

If you have made a "mistake" when presetting multiple programmes, the VCR will interpret your settings as described in the following cases.


Case 1
Programme 1
(listed first)
10:00
10:50
Programme 2
(listed next)
Will be cleared
11:30
Case 2
Programme 1
10:00
10:50
20 seconds will not be recorded
11:40
Case 3
Programme 1
10:00
11:30
Will be cut off
10:45
12:15

Case 1

If you preset two programmes to record at the same time...

The programme listed first on the PROGRAM LIST display has priority over the other programmes. The timer settings for lower priority programmes are erased from the PROGRAM LIST display when recording begins for the first programme.

Case 2

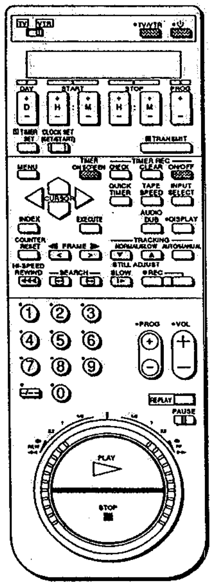
If you preset programme 2 to start recording at the same time you preset programme 1 to finish recording...

The last 20 seconds of programme 1 is not recorded because the VCR enters the recording pause mode for programme 2 before programme 1 is finished.

Case 3

If you set programme 2 to start recording before programme 1 is finished recording...

Programme 2 starts recording before programme 1 has finished.


TV
VTR
TV/VTR
DAY
START
STOP
PROG
MENU
TIMER ON SCREEN
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY
PLAY
STOP
PAUSE

Checking the Timer Settings

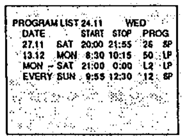
You can display your timer settings to confirm the programmes you wish to record.

1 Press TIMER REC (ON/OFF).
The TIMER REC indicator on the VCR turns off.

2 Press ⏻.

3 Press TV/VTR.

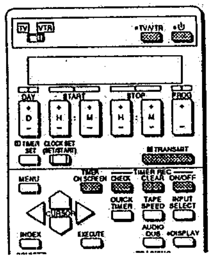
4 Press TIMER ON SCREEN.
The PROGRAM LIST appears.



```
PROGRAM LIST 24.11        WED
  DATE          START STOP  PROG
  27.11   SAT   20:00 21:55  26  SP
  13.12   MON    8:30 10:15  50  LP
  MON  ~  SAT   21:00  0:00  L2  LP
  EVERY   SUN    9:55 12:30  12  SP
```

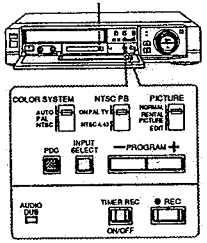
5 Press TIMER ON SCREEN to return to the original screen.

6 Press TIMER REC (ON/OFF).
The VCR returns to the timer recording standby mode.


TV
VTR
TV/VTR
DAY
START
STOP
PROG
MENU
TIMER ON SCREEN
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY

Notes:

- If you preset a programme to record only once, that setting is deleted from the PROGRAM LIST display when recording has finished.
- To check the timer settings during timer recording, do steps 3 to 4 under "Checking the Timer Settings" on page 24.


PDC indicator
COLOR SYSTEM
AUTO
PAL
NTSC
NTSC PB
ON PAL TV
NTSC 4.43
PICTURE
NORMAL
RENTAL PICTURE
EDIT
PDC
INPUT SELECT
— PROGRAM +
AUDIO DUB
TIMER REC
ON/OFF
● REC

Notes on PDC Recording

- If recording times overlap due to a PDC timer shift, the programme that was broadcast first has priority. The second programme will begin to record only when the first programme has finished.
- The PDC button is effective only when TIMER REC does not light up on the VCR.
- If the PDC singal is too weak or the broadcasting station failed to transmit PDC signals, the VCR will record the programme without using the PDC function even if the PDC indicator is lit in the display window.
- Make sure that you enter the times exactly as indicated in the TV programme guides; otherwise the recording will not be made.
- To use the PDC function properly, set the timer separately for each programme.

Changing or Cancelling the Timer Settings

You can change or cancel the timer settings by referring to the PROGRAM LIST display.

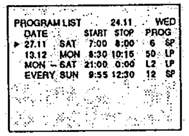
1 Press TIMER REC (ON/OFF).
The TIMER REC indicator on the VCR turns off.

2 Press ⏻.

3 Press TV/VTR.

4 Press TIMER REC CHECK to display the PROGRAM LIST.

5 Press TIMER REC CHECK to move the cursor (▶) to the programme you wish to change or cancel.



```
PROGRAM LIST        24.11      WED
  DATE          START STOP  PROG
▶ 27.11   SAT    7:00  8:00   6  SP
  13.12   MON    8:30 10:15  50  LP
  MON  ~  SAT   21:00  0:00  L2  LP
  EVERY   SUN    9:55 12:30  12  SP
```

6 **To change the setting**
Re-enter all the items and transmit the new settings to the VCR.
(See "Setting the Timer" steps 1 to 7 on pages 20 and 21.)
The VCR is automatically ready for the timer recording, or enters the timer recording standby mode.

To cancel the setting
Press TIMER REC CLEAR. To return to the original screen, press TIMER ON SCREEN. If there are other timer settings on the list, press TIMER REC ON/OFF to return to the timer recording standby mode.

PDC Recording

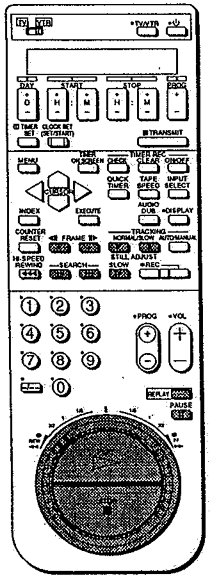
The broadcasting system transmits PDC (Programme Delivery Control) signals with its TV programmes. These signals assure you that your timer recording are made regardless of broadcast delays, early starts, or broadcast interruptions. For example, if an urgent news bulletin interrupts a regular programme, recording will stop. As soon as the interrupted programme resumes, recording starts again.

1 Make sure the TIMER REC indicator is not lit on the VCR.

2 Before setting the timer to record, press PDC on the VCR so that the PDC indicator lights in the VCR display window.

3 Set the timer following the steps under "Timer Recording" (page 20).
The VCR will enter standby mode for PDC recording before the turn-on timer so as to be ready if there is a change in the start time. The PDC indicator in the display window lights up when you press the PDC button on the VCR.

Variable Speed Playback



The following section explains the advanced playback functions available on your VCR. No sound is heard during these operations.

Variable Speed Playback Using the DUAL MODE SHUTTLE Ring

You can enjoy variable speed playback using the DUAL MODE SHUTTLE ring on either the VCR or the Remote Commander.
In any playback mode, turn the DUAL MODE SHUTTLE ring in either the forward or reverse direction. When you release the ring, normal playback resumes.

Pausing the Picture

During playback, press ❙❙ PAUSE. To resume normal playback, press either ► PLAY or ❙❙ PAUSE. If you leave your VCR in pause mode, normal playback resumes after approximately 5 minutes.

Picture Search

During playback, turn the DUAL MODE SHUTTLE ring to ◄◄ REW (rewind) or FF ►► (fast forward).
A high-speed picture appears on the TV screen.
To resume normal playback, release the DUAL MODE SHUTTLE ring at the desired scene.

Locked Picture Search

This feature allows you to lock in and view a high-speed picture while playing or pausing a tape.
During playback or while in the pause mode, press ⊖ SEARCH (forward) or ⊖ SEARCH (reverse). You can also use the ❙❙► FRAME (forward) and ◄❙❙ FRAME (reverse) buttons to change direction after either the ⊖ SEARCH or ⊖ SEARCH buttons have been pressed.
To resume normal playback, press ► PLAY.

Slow-motion Playback

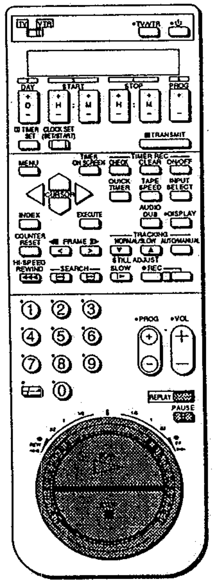
During playback or while in the pause mode, press ❙► SLOW (1/5 of normal speed). You can also use the ◄❙❙ FRAME (reverse) and FRAME ❙❙► (forward) buttons to change direction during slow-motion playback. To view a tape in slow motion in forward mode using the DUAL MODE SHUTTLE ring, turn the DUAL MODE SHUTTLE ring clockwise (for forward viewing) to 1/5, and for reverse counterclockwise (for reverse viewing) to 1/5.

Frame-by-frame Picture

While in the pause mode, press ◄❙❙ FRAME to reverse the picture one frame. Press FRAME ❙❙► to advance the picture one frame.
To resume normal playback, press either ► PLAY or ❙❙ PAUSE.

To reduce the bands on the top or bottom of the screen while in pause mode
Change to the slow motion play mode and adjust the picture with TRACKING NORMAL/SLOW (STILL ADJUST) ▼/▲.

To reduce the picture shaking while in pause mode
Adjust the picture with TRACKING NORMAL/SLOW (STILL ADJUST) ▼/▲.



Note:
Noise may occur and the colour may normally not be reproduced during variable speed playback when you play tapes recorded in LP speed depending on the TV connected to the VCR.

Replay Picture

While in the playback or pause modes, press REPLAY once on the Remote Commander. For two seconds, as displayed on the counter, the previous scene is played back in reverse mode at -X1 speed. It is then played back in forward mode at X1/5 speed (slow motion). Press REPLAY and hold it down to return to a desired scene. Release the REPLAY button to play back the scene at X1/5 speed (slow motion).
To resume normal playback or enter the pause mode, press either ► PLAY or ❙❙ PAUSE.

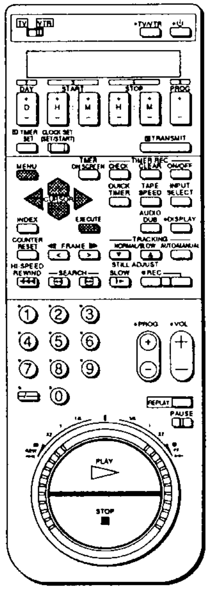
X2 Normal Speed Playback

Using this function you can view the contents of your tape at two times the normal speed in either the reverse or forward modes. To view a tape at two times the normal speed in forward mode turn the DUAL MODE SHUTTLE ring clockwise to X2, and for reverse mode conterclockwise to X2. When you release the ring, normal playback resumes.

Viewing the Picture During Fast-forward or Rewind

During fast-forward, turn the DUAL MODE SHUTTLE ring clockwise to FF ►►.
During rewind, turn the DUAL MODE SHUTTLE ring counterclockwise to ◄◄ REW.
To return to the fast-forward or rewind mode, release the ring.

Customizing Your VCR – SET UP MENU

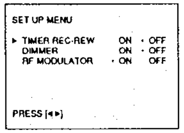

TV
VTR
TV/VTR
DAY
START
STOP
PROG
D
H
M
TIMER SET
CLOCK SET (SET/START)
TRANSMIT
MENU
TIMER ON SCREEN
TIMER REC
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
NORMAL/SLOW
AUTO/MANUAL
STILL ADJUST
HI-SPEED REWIND
SEARCH
SLOW
REC
PROG
VOL
REPLAY
PAUSE
PLAY
STOP

You can customize your VCR using the SET UP MENU.

1 Press MENU.
The main MENU appears.

2 Press ▲ or ▼ to move the cursor (▶) to SET UP MENU.

3 Press EXECUTE.
The SET UP MENU appears.



```
SET UP MENU

▶ TIMER REC-REW       ON  · OFF
  DIMMER              ON  · OFF
  RF MODULATOR      · ON    OFF



PRESS [◀▶]
```

4 Press ▲ or ▼ to move the cursor (▶) to the menu choice you want, then press ◀ or ▶ tc move the dot (·).
See below for menu choices.

5 Press EXECUTE to store the setting.

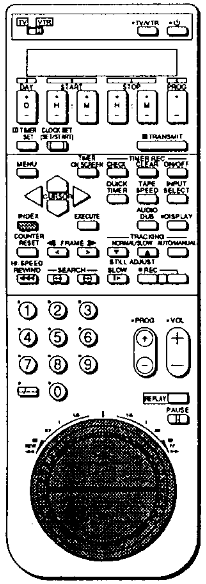
Menu choices

· TIMER REC-REW
Select "ON" to automatically rewind the tape after all timer settings have been recorded, or select "OFF" to cancel this setting. If the tape has reached the end it is automatically rewound regardless of the timer settings made.

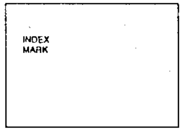
· DIMMER
Select "ON" to make the display window dimmer, or select "OFF" to make the display window brighter.

· RF MODULATOR
Select "ON" if you have made the VCR/TV connection via the aerial socket only. Select "OFF" if you have made the VCR/TV connection via the EURO-AV connector. If you have made the VCR/TV connection via the aerial socket only, and if you select RF MODULATOR to "OFF" then picture disappears. To get back the picture repeat from step 1.

Index Function


TV
VTR
TV/VTR
DAY
START
STOP
PROG
TIMER SET
CLOCK SET (SET/START)
TRANSMIT
MENU
TIMER ON SCREEN
TIMER REC
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
CURSOR
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
NORMAL/SLOW
AUTO/MANUAL
STILL ADJUST
HI-SPEED REWIND
SEARCH
SLOW
REC
PROG
VOL
REPLAY
PAUSE

You can find specific scenes easily using the markings (index points) recorded on a cassette. This function is called the index function.
The VCR automatically inserts index signals each time you use the recording, timer recording or quick-timer recording functions (index mark). The index works as a divider between scenes, and is not numbers. So, when you specify the index mark later, you have to specify the relative position from the current position (the first index, the second index... from the current position). When going from the recording pause mode to the recording mode, an index mark is not inserted.



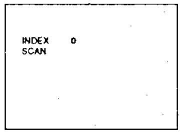
```
INDEX
MARK
```

Playing Back from the Index Point – INDEX SCAN

Here's how to find and play back a programme you've marked with an index signal.

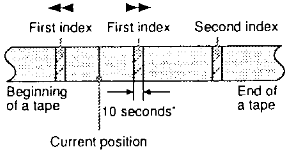
1 Insert an indexed cassette into your VCR.

2 Press INDEX once.
The INDEX SCAN indicator appears on the TV screen.



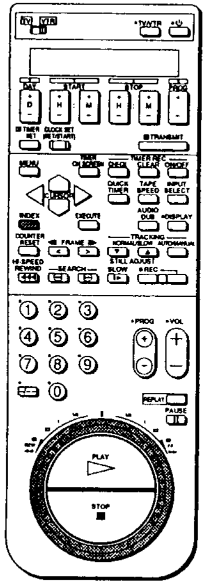
```
INDEX    0
SCAN
```

3 Turn the DUAL MODE SHUTTLE ring clockwise to FF ▶▶ (forward) to locate the following programme, or counterclockwise to ◀◀ REW (reverse) to locate the previous programme.
The VCR goes to the next or previous index signal. The VCR plays the tape for approximately 10 seconds and then moves to the next index in the selected direction. The index number changes one by one.


◀◀
▶▶
First index
First index
Second index
Beginning of a tape
10 seconds*
End of a tape
Current position

* When the tape speed is SP.

4 Press ▶ PLAY when you locate the desired index signal.



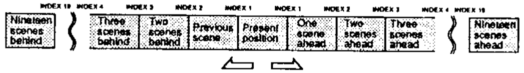
Locating an Index Mark – INDEX SEARCH

You can find an index point where you want to start playback, by entering a specific number.
For example: INDEX 8 is the number of the index signal marked on the scene you want to view.

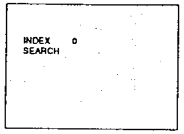
1 Insert a cassette with index signals marked on it.

2 Press INDEX repeatedly until the index mark number from which you want to start playback appears on the TV screen.

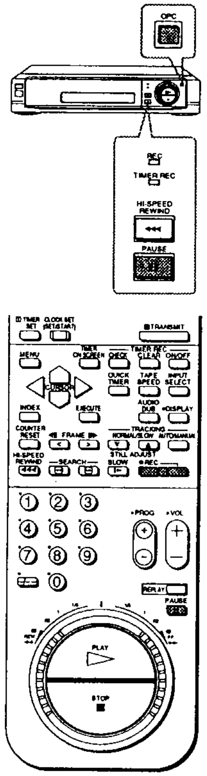
You can search for up to 19 index marks behind or ahead of the present position.


INDEX 19
INDEX 4
INDEX 3
INDEX 2
INDEX 1
INDEX 1
INDEX 2
INDEX 3
INDEX 4
INDEX 19
Nineteen scenes behind
Three scenes behind
Two scenes behind
Previous scene
Present position
One scene ahead
Two scenes ahead
Three scenes ahead
Nineteen scenes ahead

3 Turn the DUAL MODE SHUTTLE ring clockwise to FF ►► (forward) to locate the following programme or counterclockwise to ◄◄ REW (reverse) to locate the previous programme.
The VCR starts searching and the index number is counted down to zero.
Playback starts from the desired point.


INDEX 0
SEARCH

OPC (Optimum Picture Control)


OPC
PLAY
STOP

Notes:
- Tapes recorded using the OPC function are played back normally on VCRs that do not have the OPC function.
- If you have the PICTURE switch on the VCR set to EDIT, the OPC function does not operate when playing back a tape but does operate when recording. When you are editing tapes (dubbing) using this unit as either the recording VCR or the playback VCR, use the EDIT setting.

This function allows you to improve recording and playback quality by adjusting the system parameter automatically to the condition of the video heads and video tape. To maintain better picture quality, it is advisable to leave the function on so that the OPC button/indicator remains lit.

Using the OPC Function when Recording

Before you start recording, press the OPC button/indicator on the VCR so that it lights up. Press ● REC.
The OPC light flashes rapidly while the tape is being measured. The complete measurement is retained until the cassette is ejected. If you use that same tape again without ejecting it, the tape is not measured again.

When you are in the recording pause mode and the OPC button/indicator flashes slowly

The OPC function does not work if you press ❙❙ PAUSE to release the pause mode. To use the OPC function, press ● REC. After measurement is completed, the VCR returns to the recording pause mode. Press ❙❙ PAUSE to start recording.

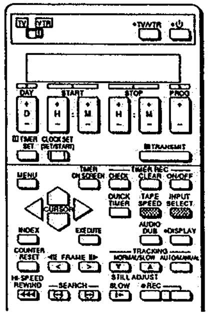
When you are using timer recording

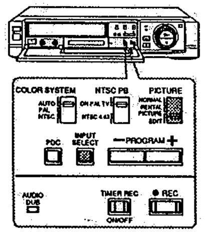
When you want to use the OPC function during timer recording pause mode, press the OPC button/indicator on so that it lights up.

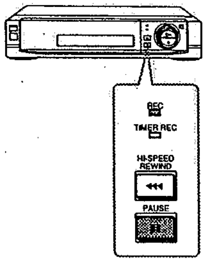
Using the OPC Function when Playing Back a Tape

When the OPC button/indicator is on, the OPC function works on all types of tapes, including rental tapes. You can play back a tape using the OPC function even if the tape was not recorded with it.

Tape Dubbing


TV/VTR
MENU
CURSOR
EXECUTE
INDEX
DISPLAY
TAPE SPEED
INPUT SELECT

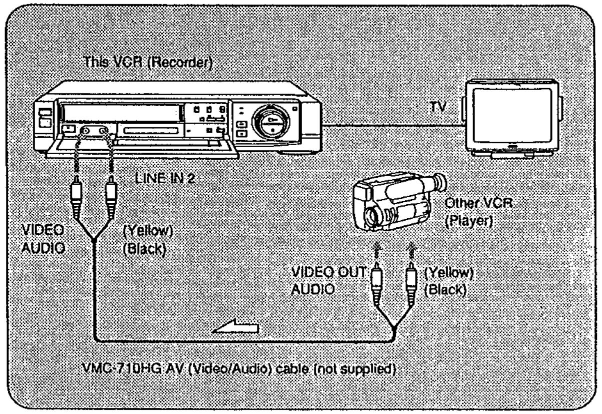

COLOR SYSTEM
NTSC PB
PICTURE
INPUT SELECT
PDC
PROGRAM +
AUDIO DUB
TIMER REC
REC
ON/OFF


REC
TIMER REC
HI-SPEED REWIND
PAUSE

Using an additional VCR, you can record programmes from one VCR to another.

Editing from Another VCR

Here's how to edit from another VCR (such as an 8 mm video camera recorder for playback) when using this VCR for recording.


This VCR (Recorder)
TV
LINE IN 2
VIDEO
AUDIO
(Yellow)
(Black)
Other VCR
(Player)
VIDEO OUT
AUDIO
(Yellow)
(Black)
VMC-710HG AV (Video/Audio) cable (not supplied)

Before you begin

- On this VCR select L2 (LINE IN 2) with INPUT SELECT.
- On this VCR select SP or LP using the TAPE SPEED button on the Remote Commander. (See page 19.)
- On this VCR set the PICTURE switch on the VCR to EDIT.
  If the other VCR has a similar switch, set it to EDIT as well.

1 Insert a cassette with a safety tab into this VCR.

2 Turn on the power of the playback VCR and insert a source cassette without a safety tab.

3 Find the playback start point and set the other VCR (playback VCR) to playback pause.

4 Find the recording start point and set this VCR (recording VCR) to recording pause.

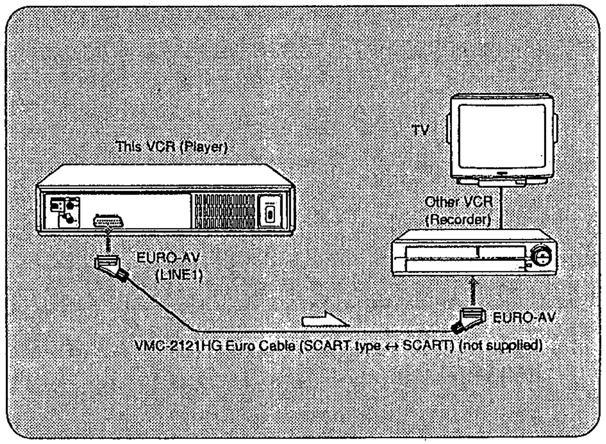
5 Press II PAUSE on both VCRs.
For best results, press II PAUSE on the playback VCR just before pressing II PAUSE on the recording VCR.
When you have finished editing, press ■ STOP on both VCRs.

Note :
You can connect another VCR to the EURO-AV connector. In this case select LINE 1 with INPUT SELECT.

Notes:
If you have the PICTURE switch on the VCR set to EDIT, the OPC function does not operate when playing back a tape but does operate when recording.
When you are editing tapes (dubbing) using this unit as either the recording VCR or the playback VCR, use the EDIT setting.
Refer to the other VCR's instruction manual for the operation.

Editing onto Another VCR

Here's how to edit onto another VCR when using this VCR for playback.


TV
This VCR (Player)
Other VCR
(Recorder)
EURO-AV
(LINE1)
EURO-AV
VMC-2121HG Euro Cable (SCART type ↔ SCART) (not supplied)

Before you begin
On this VCR set the PICTURE switch on the VCR to EDIT.
If the other VCR has a similar switch, set it to EDIT as well.

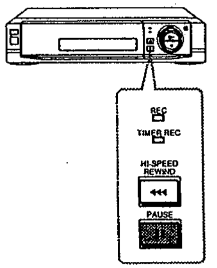
1 Insert a cassette without a safety tab into this VCR.

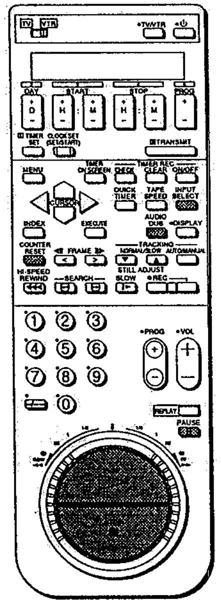
2 Turn on the power of the recording VCR and insert a cassette with a safety tab in place.

3 Find the playback start point and set this VCR (playback VCR) to playback pause.

4 Find the recording start point and set the other VCR (recording VCR) to recording pause.

5 Press II PAUSE on both VCRs.
For best results, press II PAUSE on the playback VCR just before pressing II PAUSE on the recording VCR.
When you have finished editing, press ■ STOP on both VCRs.

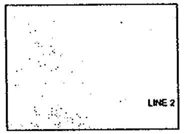

REC
TIMER REC
HI-SPEED REWIND
PAUSE


TV
VTR
TV/VTR
START
STOP
PROG
TIMER
CLOCK SET
TRANSMIT
MENU
ON SCREEN
CHECK
CLEAR
ON/OFF
QUICK TIMER
TAPE SPEED
INPUT SELECT
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
HI-SPEED REWIND
SEARCH
STILL ADJUST
SLOW
REC
PROG
VOL
REPLAY
PAUSE

Audio Dubbing

This section shows you how to dub-over new sound onto the pre-recorded normal track. This way you can replace unnecessary sound with some other sound.

1 Insert a pre-recorded cassette into the VCR, and prepare a stereo system or other audio source.



2 When you use other audio source, press INPUT SELECT until the LINE 2 indication appears on the TV screen.

3 Find the audio dubbing end point and press COUNTER RESET.
The counter shows "0H00M00S."

4 Find the audio dubbing start point and press II PAUSE to set the VCR to playback pause mode.
The DUAL MODE SHUTTLE ring is useful for this operation.

5 Press AUDIO DUB.
The AUDIO DUB indicator lights up on the VCR.

6 Press II PAUSE to release the pause, and at the same time start the stereo system or other audio source. When the tape reaches the end point (0H00M00S) sound insertion stops automatically.

To pause audio dubbing

Press II PAUSE.

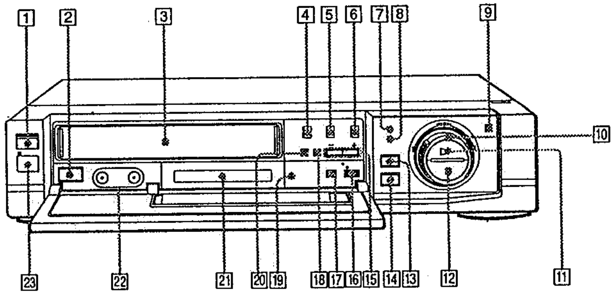
To stop audio dubbing

Press ■ STOP.

Note :
You can also dub-over new sound from another VCR by choosing LINE 1 with INPUT SELECT.

Identifying the Parts and Controls

Front Panel


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

1 ON/STANDBY switch and indicator (See page 8.)

2 ≜ EJECT button (See page 14.)

3 Cassette compartment (See page 14.)

4 COLOR SYSTEM switch (See page 15.)

5 NTSC PB switch (See page 17.)

6 PICTURE switch (See page 17.)

7 REC indicator (See page 18.)

8 TIMER REC indicator (See page 23.)

9 OPC button/indicator (See page 31.)

10 DUAL MODE SHUTTLE ring (See pages 15 and 26.)

11 ► PLAY button (See page 15.)

12 ■ STOP button (See page 15.)

13 ◀◀◀ HI-SPEED REWIND button (See page 15.)

14 II PAUSE button (See pages 15 and 26.)

15 PROGRAM +/– buttons (See page 8.)

16 ● REC button (See page 18.)

17 TIMER REC ON/OFF button (See page 21.)

18 INPUT SELECT button (See page 8.)

19 AUDIO DUB indicator (See page 34.)

20 PDC button (See page 25.)

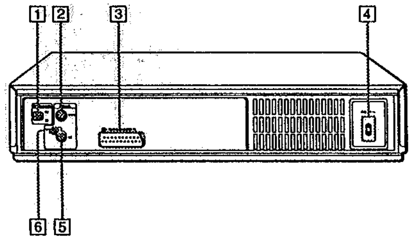
21 Display window (See page 8.)

22 LINE IN 2 VIDEO/AUDIO jacks (See page 32.)

23 Remote sensor (See page 6.)

(Continued)

Rear Panel



1 RF CHANNEL screw (See page 11.)

2 AERIAL OUT Connector (See page 7.)

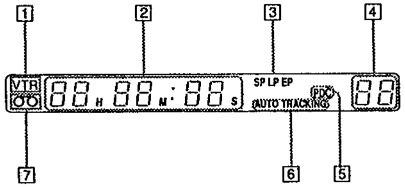
3 EURO-AV (See page 7.)

4 AC IN connector (See page 7.)

5 AERIAL IN connector (See page 7.)

6 LOCAL/DX switch (See page 11.)

Display Window


1
2
3
4
VTR
88 H 88 M : 88 S
SP LP EP
PDC
AUTO TRACKING
88
7
6
5

1 VTR indicator (See page 8.)

2 Linear time counter and clock (See page 13.)

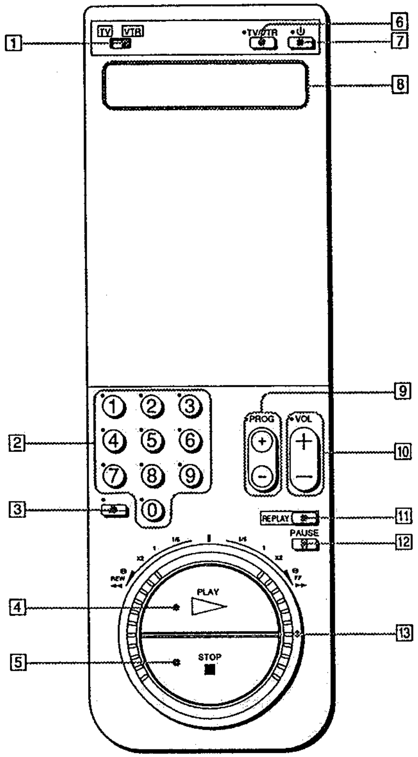
3 Tape speed indicator (See page 19.)

4 Line and programme position indicator (See page 8.)

5 PDC indicator (See page 25.)

6 AUTO TRACKING indicator (See page 17.)

7 Cassette indicator (appears when a cassette is loaded) (See page 14.)


1
TV
VTR
TV/VTR
⏻
6
7
8
9
2
1 2 3
4 5 6
7 8 9
0
PROG
VOL
10
3
REPLAY
11
PAUSE
12
REW
FF
PLAY
STOP
4
5
13

Remote Commander (with cover closed)

1 TV/VTR remote control selector (See page 6.)

2 Programme position number buttons (See pages 10 and 18.)

3 -/-- (10s digit button) (See pages 10 and 18.)

4 ► PLAY button (See page 15.)

5 ■ STOP button (See page 15.)

6 TV/VTR button (See page 8.)

7 ⏻ (on/standby) button (See page 8.)

8 Liquid-crystal display (LCD) (See page 12.)

9 PROG +/– (programme) button (See page 8.)

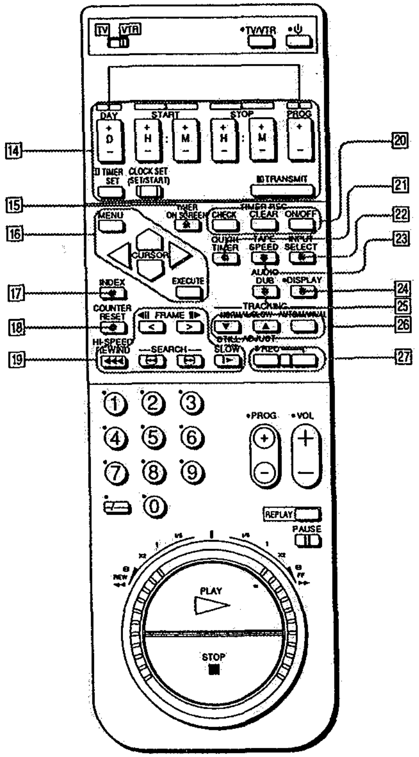
10 VOL +/– (volume) button (Press + to increase the volume and – to decrease it.)

11 REPLAY button (See page 27.)

12 II PAUSE button (See pages 15 and 26.)

13 DUAL MODE SHUTTLE ring (See pages 15 and 26.)

(Continued)



TV
VTR
TV/VTR
DAY
START
STOP
PROG
D
H
M
TIMER SET
CLOCK SET (SET/START)
TRANSMIT
MENU
TIMER ON SCREEN
CHECK
TIMER REC
CLEAR
ON/OFF
CURSOR
QUICK TIMER
TAPE SPEED
INPUT SELECT
INDEX
EXECUTE
AUDIO DUB
DISPLAY
COUNTER RESET
FRAME
TRACKING
NORMAL/SLOW
AUTO/MANUAL
STILL ADJUST
HI-SPEED REWIND
SEARCH
SLOW
REC
PROG
VOL
REPLAY
PAUSE
PLAY
STOP
REW
FF
14
15
16
17
18
19
20
21
22
23
24
25
26
27

Remote Commander (with cover opened)

14 Timer recording/clock buttons (See pages 12 and 20.)
  1 TIMER SET button
    CLOCK SET (SET/START) button
  2 DAY button
  3 START time buttons
  4 STOP time buttons
  5 PROG +/– (programme position) button
  6 TRANSMIT button

15 TIMER ON SCREEN button (See page 24.)

16 Menu operations buttons (See page 9.)
  MENU button
  Cursor buttons (▲/▼/◀/▶)
  EXECUTE button

17 INDEX button (See page 29.)

18 COUNTER RESET button (See page 16.)

19 Tape transport buttons
  ◀◀◀ HI-SPEED REWIND button (See page 15.)
  ⊖/⊕ SEARCH buttons (See page 26.)
  </> ◀II FRAME II▶ buttons (See page 26.)
  I▶ SLOW button (See page 26.)

20 TIMER REC buttons (See page 25.)
  CHECK button (See page 25.)
  CLEAR button (See page 25.)
  ON/OFF button (See page 21.)

21 QUICK TIMER button (See page 23.)

22 INPUT SELECT button (See page 8.)

23 TAPE SPEED button (See page 19.)

24 DISPLAY button (See page 16.)

25 AUDIO DUB button (See page 34.)

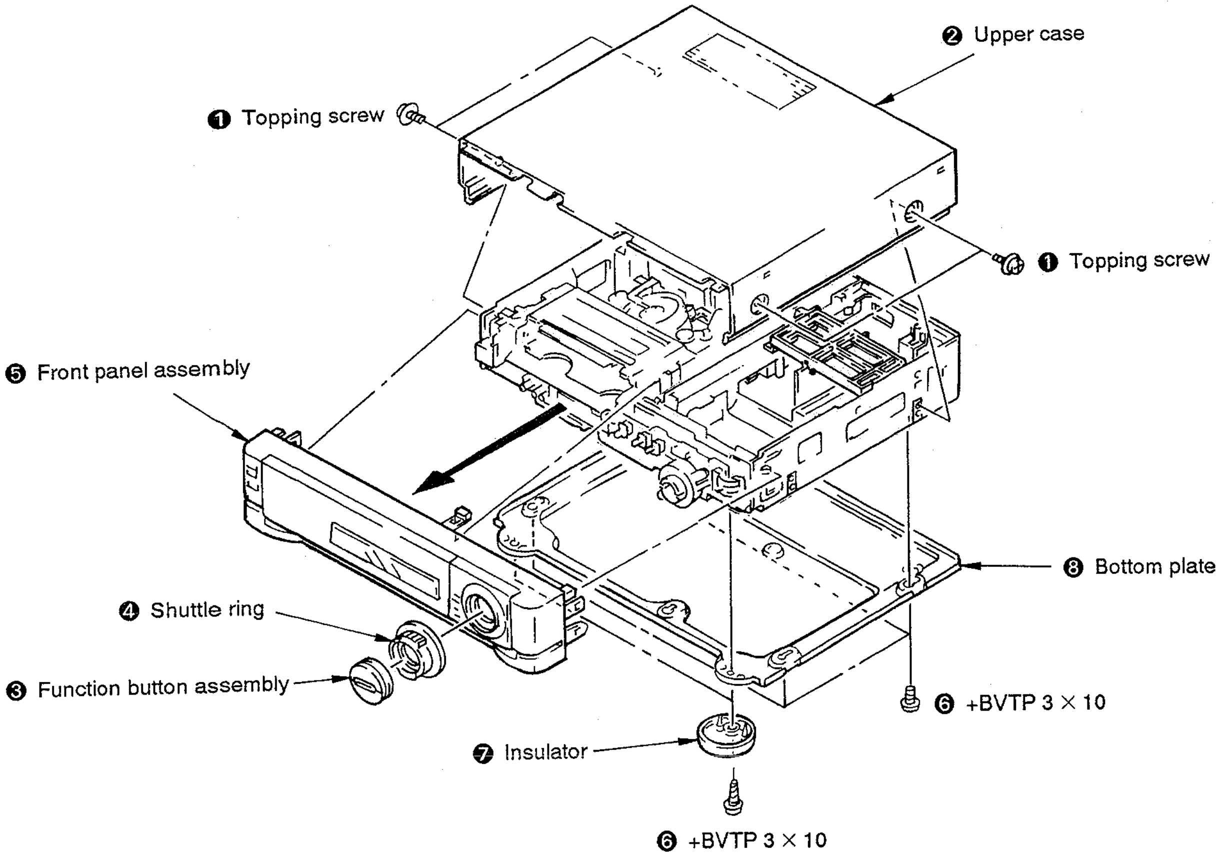
26 TRACKING buttons (See page 17.)
  ▼/▲ NORMAL/SLOW STILL ADJUST buttons
  AUTO/MANUAL button

27 ● REC buttons (See page 18.)

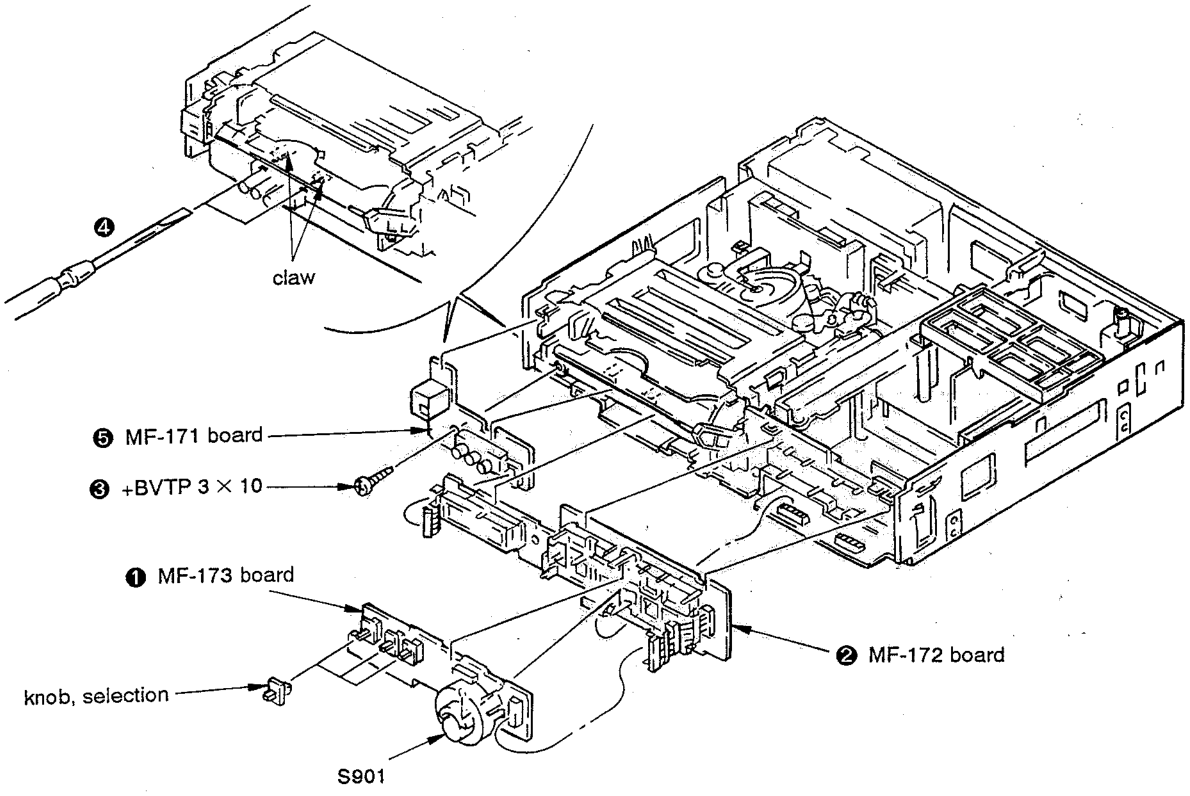
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

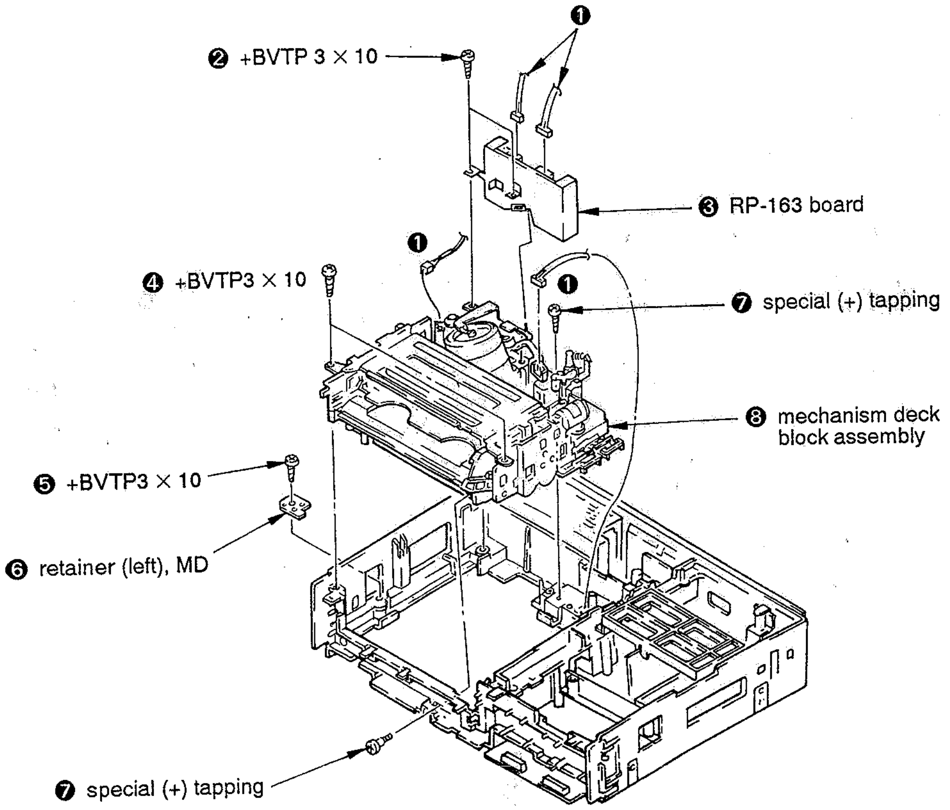
2-1. FRONT PANEL ASSEMBLY AND UPPER CASE


❷ Upper case
❶ Topping screw
❶ Topping screw
❺ Front panel assembly
❽ Bottom plate
❹ Shuttle ring
❸ Function button assembly
❻ +BVTP 3 × 10
❼ Insulator
❻ +BVTP 3 × 10

2-2. MF-171, MF-172, MF-173 BOARDS

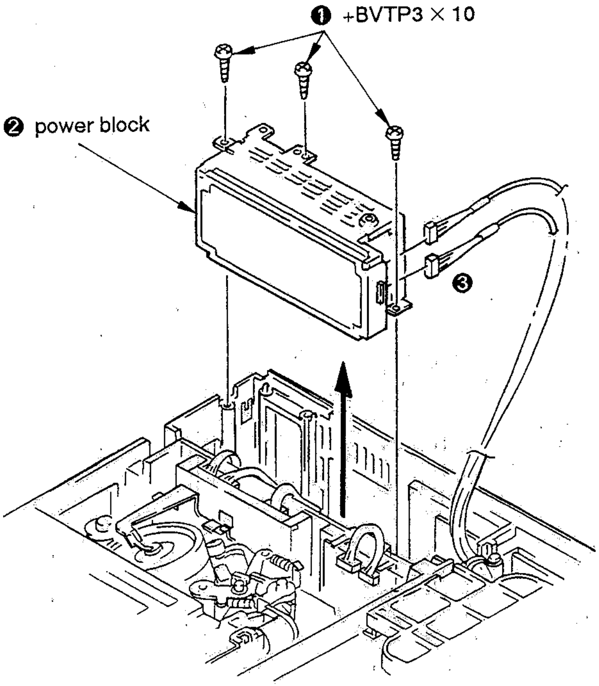

❹
claw
❺ MF-171 board
❸ +BVTP 3 × 10
❶ MF-173 board
❷ MF-172 board
knob, selection
S901

2-3. RP-163 BOARD AND MECHANISM DECK BLOCK ASSSEMBLY



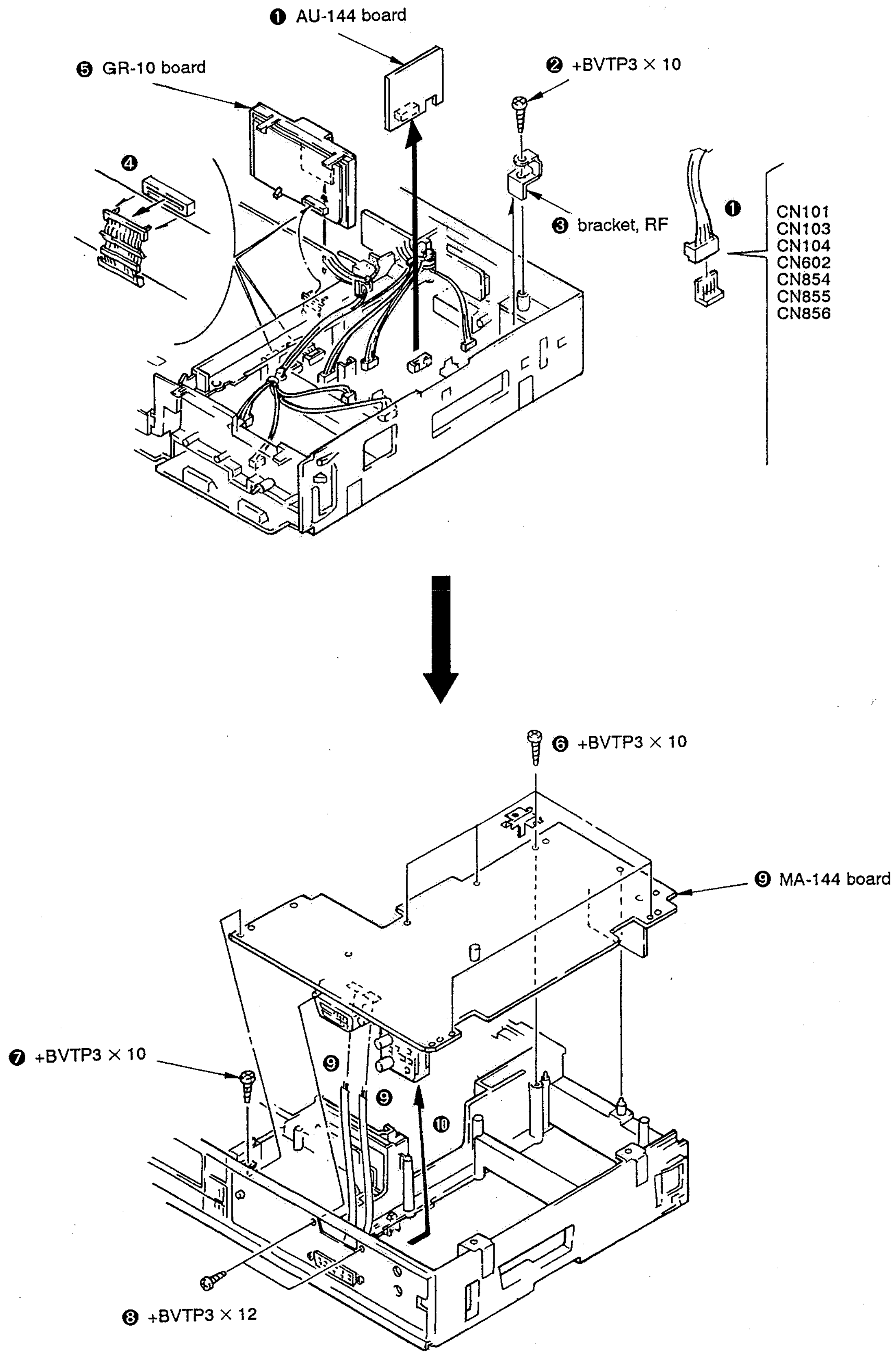
➊
➋ +BVTP 3 × 10
➌ RP-163 board
➊
➍ +BVTP3 × 10
➊
➐ special (+) tapping
➑ mechanism deck block assembly
➎ +BVTP3 × 10
➏ retainer (left), MD
➐ special (+) tapping

2-4. POWER BLOCK



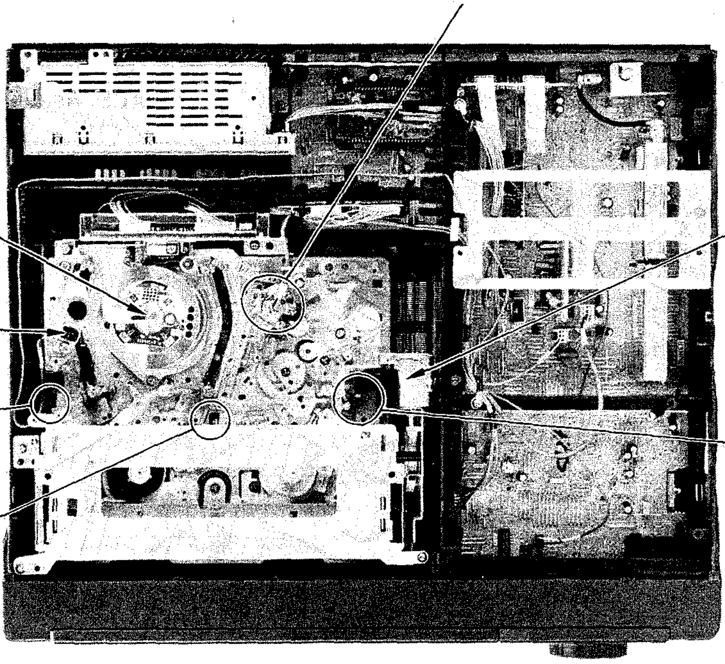
➊ +BVTP3 × 10
➋ power block
➌

2-5. AU-144, GR-10, MA-144 BOARDS


❶ AU-144 board
❺ GR-10 board
❷ +BVTP3 × 10
❹
❸ bracket, RF
❶
CN101
CN103
CN104
CN602
CN854
CN855
CN856
❻ +BVTP3 × 10
❾ MA-144 board
❼ +BVTP3 × 10
❾
❾
❿
❽ +BVTP3 × 12

2-6. INTERNAL VIEWS

– Top Side –



ACE head block ass'y
A-6761-129-A

upper drum ass'y (DZR-59-R)
1-550-869-11

bottom drum ass'y (DZL-59A-R)
1-550-870-11

M904
loading motor
X-3727-784-1

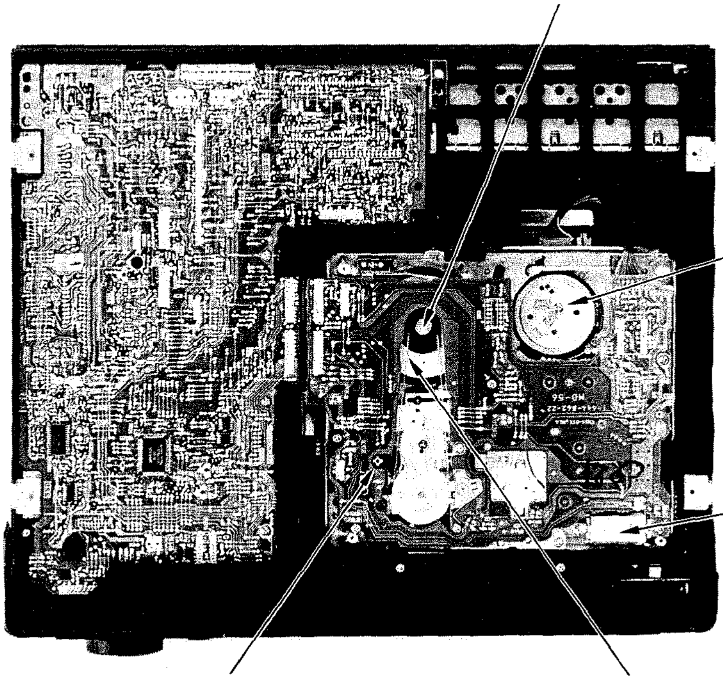
FE head
1-543-647-11

Q002
tape end sensor
8-729-926-31

Q001
tape top sensor
8-729-926-31

D001
tape top/end LED
8-719-985-00

– Bottom Side –



M902
capstan motor
8-835-489-11

M901
drum motor

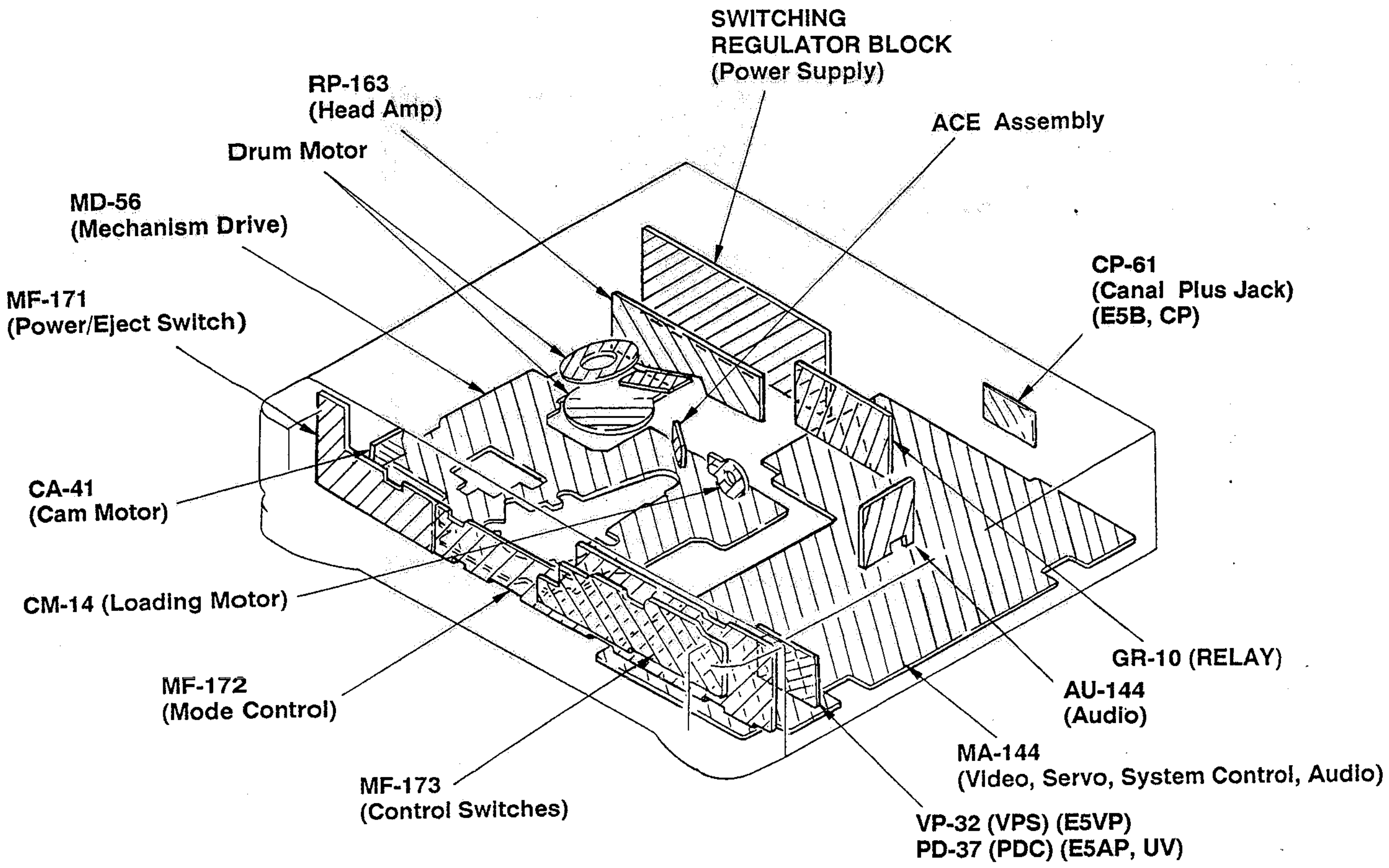
M903
cam motor
X-3733-302-1

S1
rotary switch
1-692-062-11

timing belt
3-736-013-01

SECTION 3
DIAGRAMS

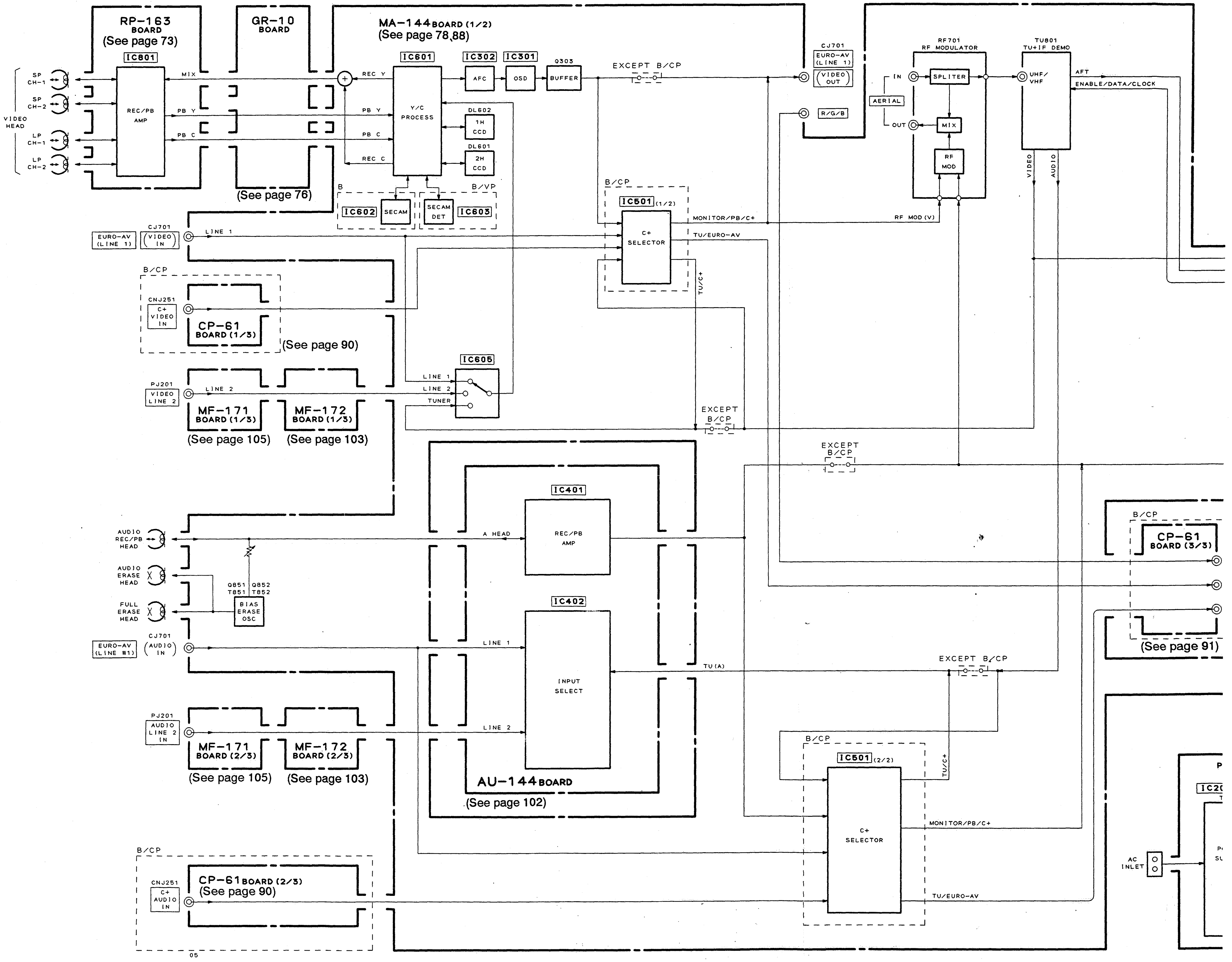
3-1. CIRCUIT BOARDS LOCATION

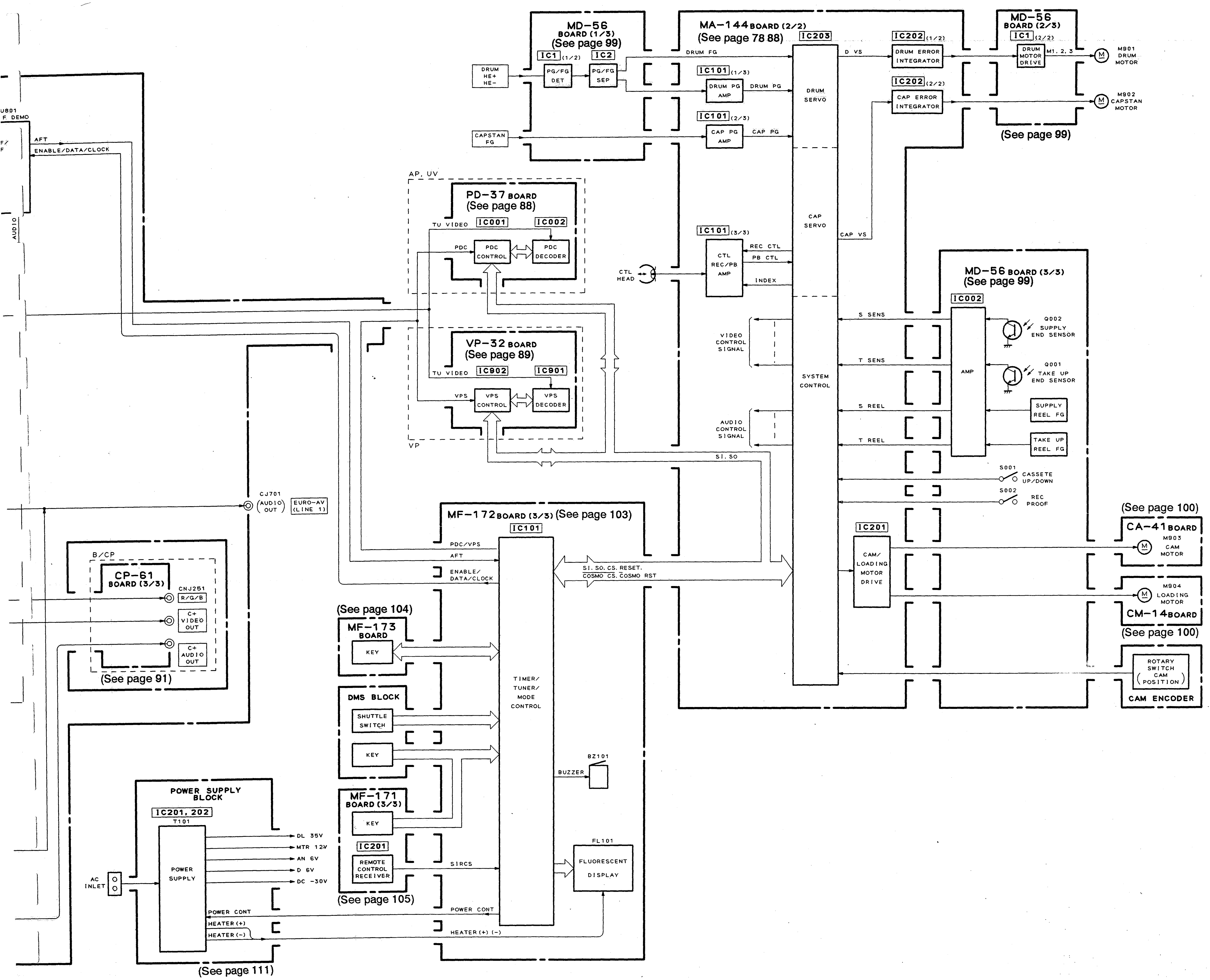

SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
ACE Assembly
Drum Motor
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CP-61
(Canal Plus Jack)
(E5B, CP)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144
(Audio)
MF-172
(Mode Control)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)

3-2. OVERALL BLOCK DIAGRAM

- In the diagrams, the model names are abbreviated as follows.

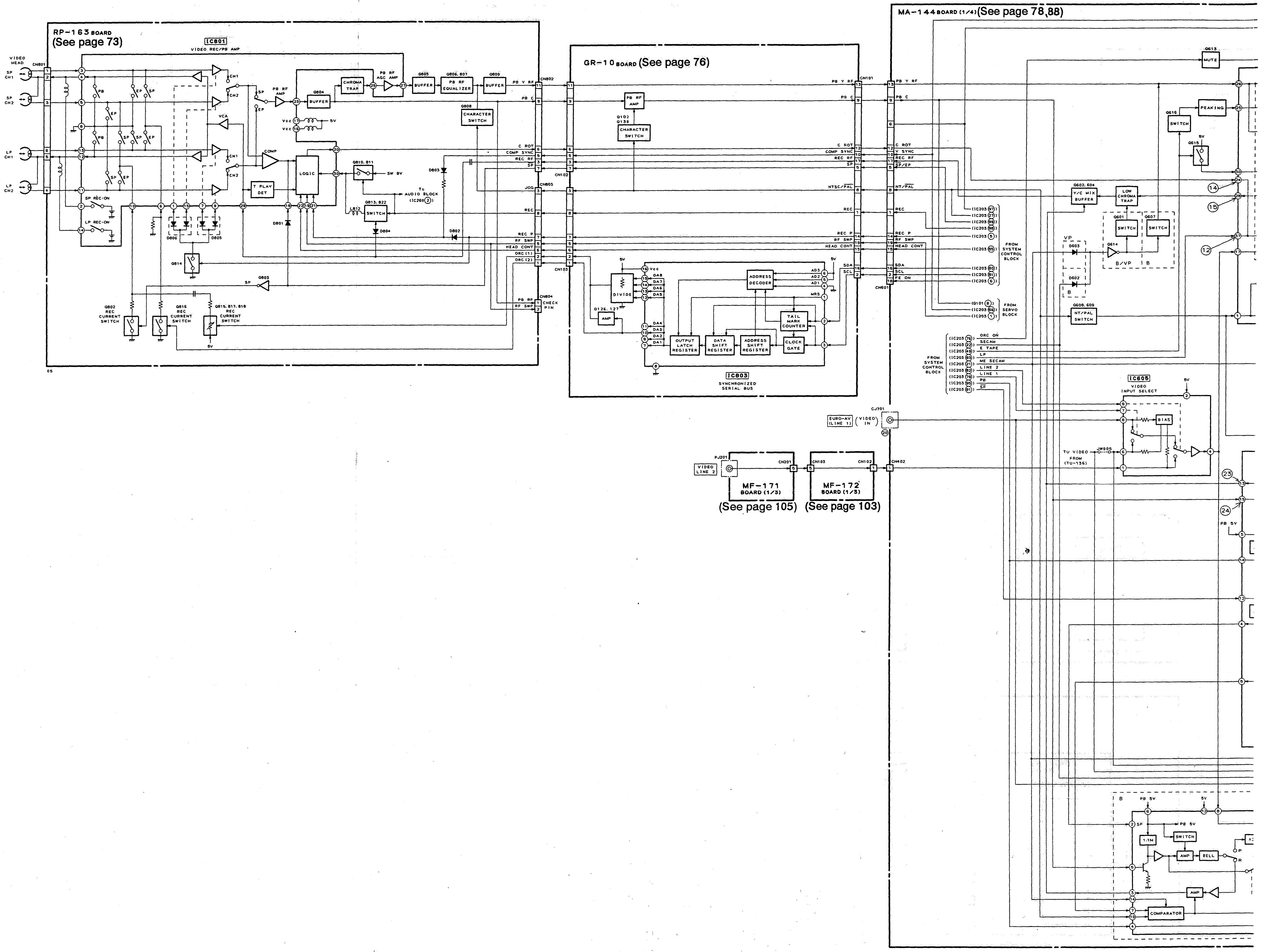
SLV-E5AE : AE
SLV-E5AP : AP
SLV-E5B : B
SLV-E5CP : CP
SLV-E5EI : EI
SLV-E5IT : IT
SLV-E5VP : VP
SLV-E6UV : UV

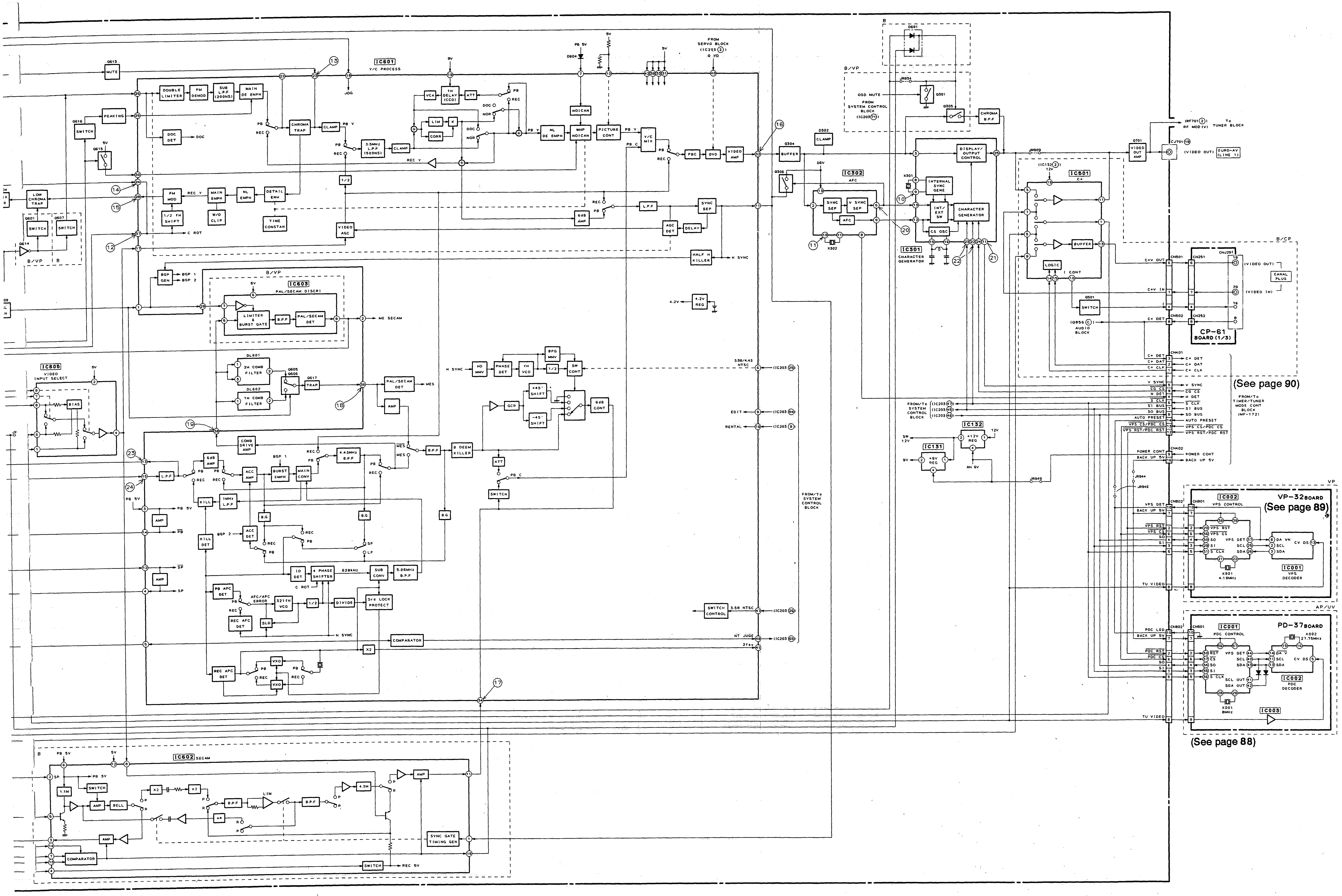

RP-163 BOARD
(See page 73)
IC801
REC/PB AMP
VIDEO HEAD
SP CH-1
SP CH-2
LP CH-1
LP CH-2
MIX
PB Y
PB C
GR-10 BOARD
(See page 76)
MA-144 BOARD (1/2)
(See page 78,88)
IC601
Y/C PROCESS
REC Y
REC C
IC302
AFC
IC301
OSD
Q303
BUFFER
DL602
1H CCD
DL601
2H CCD
B
B/VP
IC602
SECAM
SECAM DET
IC603
EXCEPT B/CP
CJ701
EURO-AV (LINE 1)
VIDEO OUT
R/G/B
RF701
RF MODULATOR
AERIAL
IN
OUT
SPLITER
MIX
RF MOD
TU801
TU+IF DEMO
UHF/VHF
AFT
ENABLE/DATA/CLOCK
VIDEO
AUDIO
RF MOD (V)
B/CP
IC501 (1/2)
C+ SELECTOR
MONITOR/PB/C+
TU/EURO-AV
TU/C+
CJ701
EURO-AV (LINE 1)
VIDEO IN
LINE 1
B/CP
CNJ251
C+ VIDEO IN
CP-61 BOARD (1/3)
(See page 90)
IC605
LINE 1
LINE 2
TUNER
PJ201
VIDEO LINE 2
LINE 2
MF-171 BOARD (1/3)
(See page 105)
MF-172 BOARD (1/3)
(See page 103)
EXCEPT B/CP
EXCEPT B/CP
IC401
REC/PB AMP
A HEAD
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
Q851 T851
Q852 T852
BIAS ERASE OSC
IC402
INPUT SELECT
LINE 1
LINE 2
TU (A)
CJ701
EURO-AV (LINE #1)
AUDIO IN
PJ201
AUDIO LINE 2 IN
MF-171 BOARD (2/3)
(See page 105)
MF-172 BOARD (2/3)
(See page 103)
AU-144 BOARD
(See page 102)
B/CP
CP-61 BOARD (3/3)
(See page 91)
EXCEPT B/CP
B/CP
IC501 (2/2)
C+ SELECTOR
TU/C+
MONITOR/PB/C+
TU/EURO-AV
B/CP
CNJ251
C+ AUDIO IN
CP-61 BOARD (2/3)
(See page 90)
AC INLET
05


MD-56 BOARD (1/3) (See page 99)
IC1 (1/2)
IC2
DRUM HE+ HE-
PG/FG DET
PG/FG SEP
CAPSTAN FG
MA-144 BOARD (2/2) (See page 78 88)
IC203
DRUM FG
IC101 (1/3)
DRUM PG AMP
DRUM PG
IC101 (2/3)
CAP PG AMP
CAP PG
DRUM SERVO
CAP SERVO
D VS
CAP VS
IC202 (1/2)
DRUM ERROR INTEGRATOR
IC202 (2/2)
CAP ERROR INTEGRATOR
MD-56 BOARD (2/3)
IC1 (2/2)
DRUM MOTOR DRIVE
M1, 2, 3
M901 DRUM MOTOR
M902 CAPSTAN MOTOR
(See page 99)
UB01
F DEMO
F/
F
AFT
ENABLE/DATA/CLOCK
AUDIO
AP, UV
PD-37 BOARD (See page 88)
TU VIDEO
IC001
IC002
PDC
PDC CONTROL
PDC DECODER
VP-32 BOARD (See page 89)
IC902
IC901
VPS
VPS CONTROL
VPS DECODER
VP
IC101 (3/3)
CTL HEAD
CTL REC/PB AMP
REC CTL
PB CTL
INDEX
VIDEO CONTROL SIGNAL
AUDIO CONTROL SIGNAL
SYSTEM CONTROL
SI, SO
MD-56 BOARD (3/3) (See page 99)
IC002
AMP
S SENS
T SENS
S REEL
T REEL
Q002 SUPPLY END SENSOR
Q001 TAKE UP END SENSOR
SUPPLY REEL FG
TAKE UP REEL FG
S001 CASSETE UP/DOWN
S002 REC PROOF
IC201
CAM/LOADING MOTOR DRIVE
(See page 100)
CA-41 BOARD
M903 CAM MOTOR
M904 LOADING MOTOR
CM-14 BOARD
(See page 100)
ROTARY SWITCH (CAM POSITION)
CAM ENCODER
CJ701
(AUDIO OUT)
EURO-AV (LINE 1)
B/CP
CP-61 BOARD (3/3)
CNJ251
R/G/B
C+ VIDEO OUT
C+ AUDIO OUT
(See page 91)
MF-172 BOARD (3/3) (See page 103)
IC101
PDC/VPS
AFT
ENABLE/DATA/CLOCK
SI, SO, CS, RESET, COSMO CS, COSMO RST
TIMER/TUNER/MODE CONTROL
(See page 104)
MF-173 BOARD
KEY
DMS BLOCK
SHUTTLE SWITCH
KEY
MF-171 BOARD (3/3)
KEY
IC201
REMOTE CONTROL RECEIVER
(See page 105)
SIRCS
BZ101
BUZZER
FL101
FLUORESCENT DISPLAY
POWER CONT
HEATER (+) (-)
POWER SUPPLY BLOCK
IC201, 202
T101
POWER SUPPLY
AC INLET
DL 35V
MTR 12V
AN 6V
D 6V
DC -30V
POWER CONT
HEATER (+)
HEATER (-)
(See page 111)

3-3. VIDEO BLOCK DIAGRAM

- Circled numbers refer to waveforms on page 75 to 77 for RP-163 board, pages 87 and 95 for MA-144 board.


RP-163 BOARD
(See page 73)
IC801
VIDEO REC/PB AMP
VIDEO HEAD
CN801
SP CH1
SP CH2
LP CH1
LP CH2
PB
EP
SP
CH1
CH2
VCA
SP REC:ON
LP REC:ON
PB RF AMP
Q804
BUFFER
CHROMA TRAP
PB RF AGC AMP
Q805
BUFFER
Q806, 807
PB RF EQUALIZER
Q809
BUFFER
Q808
CHARACTER SWITCH
Vcc
5V
COMP
LOGIC
T PLAY DET
Q810, 811
SW 9V
To AUDIO BLOCK (IC260 ②)
L812
Q813, 822
SWITCH
D801
D802
D803
D804
D805
D806
Q814
Q803
SP
Q802 REC CURRENT SWITCH
Q816 REC CURRENT SWITCH
Q815, 817, 818 REC CURRENT SWITCH
5V
CN802
PB Y RF
PB C
C ROT
COMP SYNC
REC RF
SP
CN102
CN803
JOG
REC
REC P
RF SWP
HEAD CONT
ORC (1)
ORC (2)
CN103
CN804
PB RF
RF SWP
CHECK PIN
05
GR-10 BOARD (See page 76)
PB RF AMP
Q102
Q139
CHARACTER SWITCH
CN101
NTSC/PAL
SDA
SCL
5V
Vcc
DA8
DA7
DA6
DA5
DA4
DA3
DA2
DA1
DIVIDE
Q126, 127
AMP
ADDRESS DECODER
AD3
AD2
AD1
MRS
TAIL MARK COUNTER
OUTPUT LATCH REGISTER
DATA SHIFT REGISTER
ADDRESS SHIFT REGISTER
CLOCK GATE
IC803
SYNCHRONIZED SERIAL BUS
EURO-AV (LINE 1)
(VIDEO IN)
CJ701
PJ201
VIDEO LINE 2
CN201
MF-171 BOARD (1/3)
(See page 105)
CN103
CN102
MF-172 BOARD (1/3)
(See page 103)
CN402
MA-144 BOARD (1/4) (See page 78, 88)
CN601
PB Y RF
PB C
C ROT
V SYNC
REC RF
SP/EP
NT/PAL
REC
REC P
RF SWP
HEAD CONT
SDA
SCL
FE ON
(IC203 97)
(IC203 27)
(IC203 99)
(IC203 98)
(IC203 5)
(IC203 85)
(IC203 80)
(IC203 81)
(IC203 6)
FROM SYSTEM CONTROL BLOCK
(Q101 B)
(IC203 66)
(IC203 1)
FROM SERVO BLOCK
(IC203 76) ORC ON
(IC203 22) SECAM
(IC203 49) E TAPE
(IC203 93) LP
(IC203 21) ME SECAM
(IC203 82) LINE 2
(IC203 79) LINE 1
(IC203 95) PB
(IC203 81) SP
FROM SYSTEM CONTROL BLOCK
Q613
MUTE
Q616
SWITCH
PEAKING
Q615
5V
Q602, 604
Y/C MIX BUFFER
LOW CHROMA TRAP
Q601
SWITCH
Q607
SWITCH
Q614
B/VP
B
VP
D603
D602
B
Q608, 609
NT/PAL SWITCH
14
15
12
IC605
VIDEO INPUT SELECT
5V
BIAS
TU VIDEO FROM (TU-136)
JW905
20
23
24
PB 5V
B
PB 5V
5V
SP
PB 5V
SWITCH
1.1M
AMP
BELL
P
R
AMP
COMPARATOR


IC601 Y/C PROCESS
IC603 PAL/SECAM DISCRI
IC605 VIDEO INPUT SELECT
IC602 SECAM
IC302 AFC
IC301 CHARACTER GENERATOR
IC501 C+
IC131
IC132
DOUBLE LIMITER
FM DEMOD
SUB L.P.F (200NS)
MAIN DE EMPH
DOC DET
CHROMA TRAP
CLAMP
PEAKING
SWITCH
MUTE
LOW CHROMA TRAP
FM MOD
1/2 FH SHIFT
MAIN EMPH
NL EMPH
DETAIL ENH
W/D CLIP
TIME CONSTAN
VIDEO AGC
VCA
1H DELAY (CCD)
ATT
LIM
CORR
3.5MHz L.P.F (500NS)
NL DE EMPH
NOICAN
WHP NOICAN
PICTURE CONT
Y/C MIX
FBC
GVD
VIDEO AMP
6dB AMP
L.P.F
SYNC SEP
AGC DET
DELAY
HALF H KILLER
BGP GEN
LIMITER & BURST GATE
B.P.F
PAL/SECAM DET
ME SECAM
DL601 2H COMB FILTER
DL602 1H COMB FILTER
Q617 TRAP
PAL/SECAM DET
COMB DRIVE AMP
ACC AMP
BURST EMPH
MAIN CONV
4.43MHz B.P.F
KILL
1MHz L.P.F
KILL DET
ACC DET
ID DET
4 PHASE SHIFTER
SUB CONV
5.06MHz B.P.F
PB APC DET
321fH VCO
DIVIDE
3rd LOCK PROTECT
REC AFC DET
SLD
COMPARATOR
REC APC DET
VXO
HD MMV
PHASE DET
fH VCO
BPG MMV
SW CONT
GCR
+45° SHIFT
-45° SHIFT
6dB CONT
B DEEM KILLER
SWITCH CONTROL
4.2V REG
FROM/To SYSTEM CONTROL BLOCK
BUFFER
SYNC SEP
V SYNC SEP
AFC
INTERNAL SYNC GENE
INT/EXT SW
CS OSC
CHARACTER GENERATOR
DISPLAY/OUTPUT CONTROL
OSD MUTE FROM SYSTEM CONTROL BLOCK
CHROMA B.P.F
VIDEO OUT AMP
To RF MOD (V) TUNER BLOCK
(VIDEO OUT) EURO-AV (LINE 1)
LOGIC
SWITCH
(Q856 C) AUDIO BLOCK
CP-61 BOARD (1/3)
CANAL PLUS
(VIDEO OUT)
(VIDEO IN)
(See page 90)
FROM/To TIMER/TUNER MODE CONT BLOCK (MF-172)
VP-32 BOARD
(See page 89)
IC002 VPS CONTROL
IC001 VPS DECODER
PD-37 BOARD
IC001 PDC CONTROL
IC002 PDC DECODER
IC003
(See page 88)
SYNC GATE TIMING GEN
BELL

3-4. SYSTEM CONTROL – VIDEO BLOCK INTERFACE

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	REC• PAUSE
$\overline{\text{V•PB}}$	MA-144 IC203 (95)	O	H	H	H	L	L	L	L	L	L	H	H
HEAD CONT	MA-144 IC203 (85)	O	L	L	L	L	HI-Z (2.5 V)	*1	*10	*5	*5	L	L
RF SW P (SW30)	MA-144 IC203 ①	O	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
Q VD/V MUTE	MA-144 IC203 ②	O	L	L	L	*3	*4	*4	*4	*4	*4	L	L
$\overline{\text{SP}}$	MA-144 IC203 (91)	O	*6	*6	*6	*7	*7	*7	*7	*7	*7	*6	*6
EP	MA-144 IC203 (92)	O	*12	*12	*12	*7	*7	*7	*7	*7	*7	*12	*12
LP	MA-144 IC203 (93)	O	*13	*13	*13	*7	*7	*7	*7	*7	*7	*13	*13
REC•P	MA-144 IC203 ⑤	O	L	L	L	L	L	L	L	L	L	L	H
REC	MA-144 IC203 (98)	O	L	L	L	L	L	L	L	L	L	H	H
V SYNC	MA-144 IC203 (66)	I	*8	*8	*8	*8	*8	*8	*8	*8	*8	*8	*8
$\overline{\text{OSD MUTE}}$	MA-144 IC203 (71)	O	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9
EDIT	MA-144 IC203 (94)	O	*11	*11	*11	*14	*14	*14	*14	*14	*14	*11	*11
E TAPE	MA-144 IC203 ㊾	O	H	H	H	*15	*15	*15	*15	*15	*15	H	H
RENTAL	MA-144 IC203 ⑨	O	L	L	L	*16	*16	*16	*16	*16	*16	L	L
NTSC/$\overline{\text{PAL}}$	MA-144 IC203 ㉗	O	*17	*17	*17	*18	*18	*18	*18	*18	*18	*17	*17
3.58NTSC	MA-144 IC203 ㉖	O	*19	*19	*19	*20	*20	*20	*20	*20	*20	*19	*19
3.58/4.43NTSC	MA-144 IC203 ㉕	O	*17	*17	*17	*21	*21	*21	*21	*21	*18	*17	*17
JOG	MA-144 IC203 (97)	O	L	L	L	L	H	H	H	H	H	L	L
SECAM	MA-144 IC203 ㉒	I/O	*22	*22	*23	*24	*24	*24	*24	*24	*24	*22	*22
MESECAM	MA-144 IC203 ㉑	I/O	*22	*22	*23	*23	*23	*23	*23	*23	*23	*22	*22
ORC SEttei	MA-144 IC203 (76)	O	L	L	L	L	L	L	L	L	L	*25	*25
$\overline{\text{ORC SEttei}}$	RP-149 IC803 ⑦	O	H	H	H	H	H	H	H	H	H	*26	*26
$\overline{\text{E TAPE}}$	RP-149 IC803 ⑨	O	L	L	L	*27	*27	*27	*27	*27	*27	L	L
ORC DEFAULT	RP-149 IC803 ⑩	O	*28	*28	*28	H	H	H	H	H	H	*28	*28
NTSC	RP-149 IC803 ⑪	O	*17	*17	*17	*18	*18	*18	*18	*18	*18	*17	*17

*1. Foward slow mode: "HI-Z (2.5 V)" in tape stop, "L" in tape running (approx. 40 msec.).
Foward slow mode: "HI-Z (2.5 V)" in tape stop, "H" in tape running SP mode (approx. 40 msec.).
"L" in tape running EP mode (approx. 40 msec.).

*2. Synchronized with drum rotation. 30 Hz 50% duty pulse.

*3. Normally "L". "H" when CTL signal is not generated.

*4. V period "H" pulse.

*5. "H" in SP mode. "L" in EP mode.

*6. Selected by REC mode. SP mode: "L".

*7. Selected by tape recording mode.

Signal \ Model	SP	LP	EP
$\overline{\text{SP}}$ (91)	L	H	H
EP (92)	L	L	H
LP (93)	L	H	L

*8. Composite Sync signal (positive).

*9. "L" when menu screen or blue back screen.

*10. "HI-Z (2.5 V)" in EP mode. "H" in SP mode.

*11. Selected by "PICTURE SW": "H" in EDIT position.

*12. Selected by REC mode: "H" EP mode.

*13. Selected by REC mode: "H" LP mode.

*14. Selected by "PICTURE SW": "H" in EDIT position. "H" when "E TAPE" is "H" (Euro model, PAL PB).

*15. "L" when APC is off. "H" when APC is ON and "HG tape" is used.

*16. Selected by "PICTURE SW". "H" in RENTAL position or "H" when Low grade tape is used in APC ON mode.

*17. "H" when input signal is NTSC mode (GA-PAL model) (Euro-PAL mode).
"H" when input signal is NTSC mode (NTSC model).

*18. Selected by "Color system SW": "H" in NTSC mode (GA-PAL, Euro-PAL model).
"H" (NTSC model).

*19. "H" when input signal is NTSC3.58 mode (GA-PAL model).
"L" (Euro-PAL, NTSC model).

*20. Selected by "NTPB SW": "H" in NTSC3.58 position.

*21. Selected by "NTPB SW": "H" in NTSC3.58 or 4.43 position.

*22. "L" when input signal is NTSC mode, "HI-Z" in PAL/SECAM/MESECAM mode (GA-PAL, Euro-PAL model).
"L" (NTSC model).

*23. Selected by "Color system SW": "L" in NTSC mode, "HI-Z" in PAL/SECAM/MESECAM mode.

*24. Selected by "Color System SW": "L" in NTSC mode or PAL/SECAM/MESECAM – LP mode.
"HI-Z" in (PAL/SECAM/MESECAM) – SP mode.

*25. "H" during APC measurement.

*26. "L" during APC measurement.

*27. "H" when APC is off. "L" when APC is ON and "HG-tape" is used.

*28. "H" when APC is off or APc measurement is not done.

3-5. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	PEC• PAUSE	PB INDEX WRT/ERS
REC CTL	MA-144 IC203 ⑦	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	
$\overline{\text{CAP STOP}}$	MA-144 IC203 ㊳	O (O.D)	L	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	L	*3	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	
STEP PLS	MA-144 IC203 ㉔	O	L	L	L	L	L	L	L	*2	L	L	L	L	L	
CTL REC	MA-144 IC203 ㉘	O	L	L	L	L	L	L	L	L	L	L	L	H	H	H
INDEX	MA-144 IC203 ㉚	O	L	L	L	L	L	L	L	L	L	L	L	L	L	H
PB CTL	MA-144 IC203 (67)	I	H	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H	
VD CTL	MA-144 IC203 (77)	I	H	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H	
DRUM PG	MA-144 IC203 (68)	I	*4	*7	*7	*5	*5	*7	*7	*7	*7	*7	*7	*7	*7	
DRUM FG	MA-144 IC203 (69)	I	*4	*8	*8	*5	*5	*8	*8	*8	*8	*8	*8	*8	*8	
CAP FG	MA-144 IC203 (70)	I	H/L	*6	*6	*5	*5	*6	H/L	*9	*6	*6	*6	*6	H/L	
CAP RVS	MA-144 IC203 (72)	O	H/L	L	H	L	H	L	L	*2	L	L	H	L	L	
CAP DA	MA-144 IC203 (73)	O	*10	*10	*10	*10	*10	*11	*10	*10	*11	*11	*11	*11	*10	
DRUM DA	MA-144 IC203 (74)	O	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	
CTL STEP	MA-144 IC203 ㉙	O	L	L	L	L	L	L	L	*13	L	L	L	L	L	

*1. 30 Hz or 25 Hz pulse.
*2. Pulse at tape running.
*3. Reverse logic pulse of STEP PLS.
*4. "L" when drum rotation stop.
*5. Unstable period pulse.
*6. Pulse of period in proportion to tape speed.
*7. 30 Hz or 25 Hz pulse.
*8. 360 Hz or 300 Hz or 180/150 Hz pulse.
*9. Pulse at tape running.
*10. Approx. 2 msec period "H" or "L" pulse.
*11. Approx. 1.5 msec period "H" or "L" pulse.
*12. Approx. 3 msec period "H" or "L" pulse.
*13. "H" when FWD direction and STEP drive.

3-6. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE

Signal	Pin No.	I/O	HI-SPEED REW	EJECTED	CASSETTE LOADING	CASSETTE UNLOAD-ING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	PEC• PAUSE
CAM *1	MA-144 IC203 ⑫	O	L	L	L	L	H	H	L	L	L	L	L	L	L	L	L	L	L
LOAD	MA-144 IC203 ⑭	O	L	L	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
CW/CCW	MA-144 IC203 ⑬	O			H	L	H	L											
MODE 1	MA-144 IC203 ㊿	I	H	L	L	L	H	H	L	H	H	H	L	L	H	H	H	H	L
MODE 2	MA-144 IC203 (57)	I	L	H	H	H	H	H	L	L	L	L	H	H	L	L	L	L	H
MODE 3	MA-144 IC203 (56)	I	H	H	H	H	L	L	L	L	L	H	H	H	H	H	L	H	H
MODE 4	MA-144 IC203 (55)	I	H	H	H	H	H	H	L	H	H	L	L	L	L	L	L	L	L
REC PRF	MA-144 IC203 ⑮	I	*2	L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
C-UP/DOWN	MA-144 IC203 ⑯	I	L	H	H→L	L→H	L	L	L	L	L	L	L	L	L	L	L	L	L
TREEL FG	MA-144 IC203 (64)	I	*3	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
SREEL FG	MA-144 IC203 (63)	I	*3	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
END LED	MA-144 IC203 ㉜	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
CAP TRQ 1	MA-144 IC203 ㉝	O (O.D)	*1							*1	*1			*6		*1	*1		
CAP TRQ 2	MA-144 IC203 ㉞	O (O.D)								*1	*1								
$\overline{\text{CAP STOP}}$	MA-144 IC203 ㊳	O (O.D)	H	L	L	L	H	H	L	H	H	H	L	*5	H	H	H	H	L
CAP RVS	MA-144 IC203 (72)	O	H	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
CAP DA	MA-144 IC203 (73)	O																	
T SENS	MA-144 IC203 ⑰	I	*7	*4	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
S SENS	MA-144 IC203 ⑱	.I	*7	*4	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7

*1. "H" when mechanism mode transition.
*2. "L" when erasing protection tab is bent, "H" when not bent.
*3. Pause of period in proportion to reel rotating speed.
*4. Approx. 2 msec period "H" pulse.
*5. Pulse at tape running.
*6. "L" when tape running and CAP RVS is "H".
*7. Normally "L". 2 msec period "H" pulse when tape top or tape end is detected.

3-7. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE

Signal	Pin No.	I/O	I/O level
$\overline{\text{COSMO•RESET}}$	MA-144 IC203 ㊵	I	Normally "H". "L" when service interruption is detected or restored.
$\overline{\text{COSMO•CS}}$	MA-144 IC203 ㊹	I	Chip select signal from timer microprocessor. V period "L" pulse.
SI•BUS	MA-144 IC203 ㊺	I	Serial communication data from timer microprocessor. V period "L" pulse.
SO•BUS	MA-144 IC203 ㊻	O	Serial communication data to timer microprocessor. V period "L" pulse.
S CLK	MA-144 IC203 ㊼	I	Serial communication clock with timer microprocessor. V period "L" pulse.

3-8. SYSTEM CONTROL – AUDIO BLOCK INTERFACE

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOAD-ING	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	REC• PAUSE
AF PB	MA-144 IC203 (96)	O	L	L	L	H	H	H	H	H	H	H	L
STEREO/L/$\overline{\mathrm{R}}$	MA-144 IC203 (84)	I/O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
$\overline{\mathrm{HiFi}}$/M/N	MA-144 IC203 (83)	I/O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
AF ENVELOP	MA-144 IC203 (61)	I	AF RF envelope signal input terminal for automatic tracking.										
NA PB	MA-144 IC203 ⑪	O	L	L	L	H	H	H	H	H	H	L	L
A MUTE	MA-144 IC203 ㊲	O (O.D)	L	L	L	*4	H	H	H	H	H	L	L
$\overline{\mathrm{SP}}$	MA-144 IC203 (91)	O	*2	*2	*2	*3	*3	*3	*3	*3	*2	*2	*2
NA REC•$\overline{\mathrm{P}}$	MA-144 IC203 ⑩	O	L	L	L	L	L	L	L	L	L	H	L
AF REC•$\overline{\mathrm{P}}$	MA-144 IC203 ④	O	L	L	L	L	L	L	L	L	L	H	L
AF SWP	MA-144 IC203 (100)	O	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
AF SW POSITION	MA-144 IC203 (51)	I	Input terminal for AF switching position adjustment.										
FULL $\overline{\mathrm{ERS}}$	MA-144 IC203 ㊱	O (O.D)	H	H	H	H	H	H	H	H	H	L	H

*1. Selected by audio monitor.

Signal \ Audio Monitor	STEREO OR MAIN, SUB, L, R	MAIN L	SUB R	(NORMAL)	HiFi MIX
STEREO/L/$\overline{\mathrm{R}}$	H	M (HI-Z)	L	X	H
$\overline{\mathrm{HiFi}}$/M/N	L	L	L	H	M (HI-Z)

*2. Selected by REC mode selector. SP mode: "L".

*3. Selected by tape recording mode. SP mode: "L".

*4. 30 Hz or 25 Hz, 50% duty pulse approx. 5 msec delayed from RF SW P.

3-9. SYSTEM CONTROL – TUNER BLOCK INTERFACE

Signal	Pin No.	I/O	I/O level
TAMUTE	MA-144 IC203 ㉓	O	Tuner audio mute output. "H" when not used channel is selected.

3-10. SYSTEM CONTROL AND RF MODULATOR – INPUT SELECTION BLOCK INTERFACE

Signal	Pin No.	I/O	I/O level
AV CONT	MA-144 IC203 ⑲	O	"L" when RF modulator through.
LINE 1	MA-144 IC203 (79)	O	*1. Input select control signal.
LINE 2	MA-144 IC203 (82)	O	

*1.

Signal \ Input	Tuner	LINE 1	LINE 2
LINE 1 (79)	L	H	L
LINE 2 (82)	L	L	H

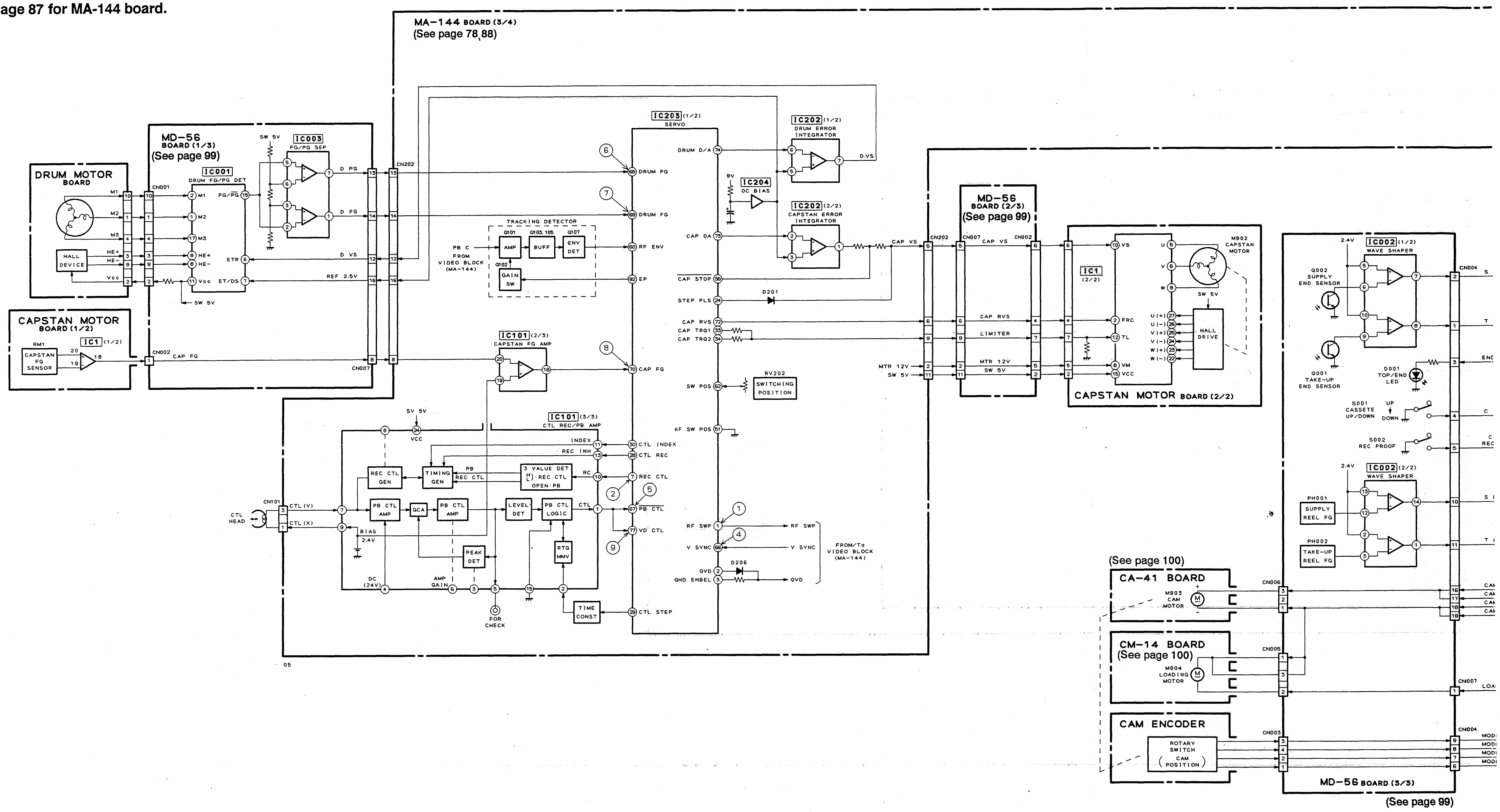
3-11. SERVO SYSTEM CONTROL – MICROPROCESSOR PIN FUNCTION (MA-144 BOARD IC203)

Pin No.	Port	I/O	Signal	Function
1	PB5/PPO13	O	RF SWP	Video switching pulse output
2	PB4/PPO12	O	Q VD	False VD pulse output
3	PB3/PPO11	O	Q HD ENBL	False HD voltage level control
4	PB2/PPO10	O	AF REC $\overline{\text{P}}$	"H" output when hi-fi audio REC
5	PB1/PPO9	O	RECP	"H" output when video REC•PAUSE
6	PB0/PPO8	O	FE ON	Flaying erase ON/OFF
7	PC7/RTO7	O	REC CTL	REC CTL output
8	PC6/RTO6	O	INT VD	Internal VD signal. Not used
9	PC5/RTO5	O	RENTAL	"H" output when "RENTAL" or "Low grade TAPE" PB
10	PC4/RTO4	O	NA REC$\overline{\text{P}}$	"H" when normal audio REC
11	PC3/RTO3	O	NA PB	"H" when normal audio playback
12	PC2/PPO18	O	CAM	CAM motor select
13	PC1/PPO17	O	CW	Clockwise/counterclockwise signal output
14	PC0/PPO16	O	LOAD	Load motor select
15	PJ7	I	CIN/REC PRF	Erasing protection tab, cassette IN detection input
16	PJ6	I	C DOWN	Cassette up/down detection input
17	PJ5	I	T SENS	T end sensor input
18	PJ4	I	S SENS	S end sensor input
19	PJ3	O	MOD CONT	RF modulator ON/OFF control
20	PJ2	O	AV CONT	Euro 21pin TV/VTR control
21	PJ1	I/O	MESECAM	"L" in NT mode. "HI-Z" in PAL (50 Hz) mode
22	PJ0	I/O	SECAM	"L" in NT mode. "HI-Z" in PAL (50 Hz) mode
23	PD7	O	TA MUTE	Tuner audio MUTE signal
24	PD6	O	STEP PLS	"H" when capstan step drive
25	PD5	O	3.58/4.43 NTSC	"H" when 3.58 or 4.43 NTSC PB
26	PD4	O	3.58 NTSC	"H" when 3.58 NTSC PB
27	PD3	O	NTSC/$\overline{\text{PAL}}$	"H" when NTSC mode
28	PD2	O	CTL REC	"H" when CTR writing
29	PD1	O	CTL STEP	STEP motion control of CTL amp
30	PD0	O	INDEX	Index control. "H" when playback index writing or erasing
31	PH7	O		Not used
32	PH6	O	END LED	END sensor lamp drive output
33	PH5	O	CAP TPQ2	Capstan current control. "L" when FF/REW ➡ stop
34	PH4	O	CAP TPQ1	Capstan current control. "L" when slow down
35	PH3	O	PAL	"H" when PAL mode
36	PH2	O	$\overline{\text{FULL ERS}}$	"L" when full erase head operation
37	PH1	O	A MUTE	Audio MUTE output
38	PH0	O	$\overline{\text{CAP STOP}}$	Capstan STOP signal output
39	MP	I	MP	Fixed at "L" level
40	$\overline{\text{RST}}$	I	$\overline{\text{COSMO RST}}$	System reset input
41	Vss			GND
42	XTAL		XTAL	System clock 12 MHz
43	EXTAL		EXTAL	
44	$\overline{\text{CSO}}$	I	$\overline{\text{COSMO CS}}$	Chip select signal
45	SI0	I	SI0	Signal for serial communication
46	SO0	O	SO0	
47	$\overline{\text{SCK0}}$	I	$\overline{\text{SCK0}}$	
48	PF7/AN11	O	AMS MUTE	Not used
49	PF6/AN10	O	E TAPE	"H" when "HG-TAPE" PB

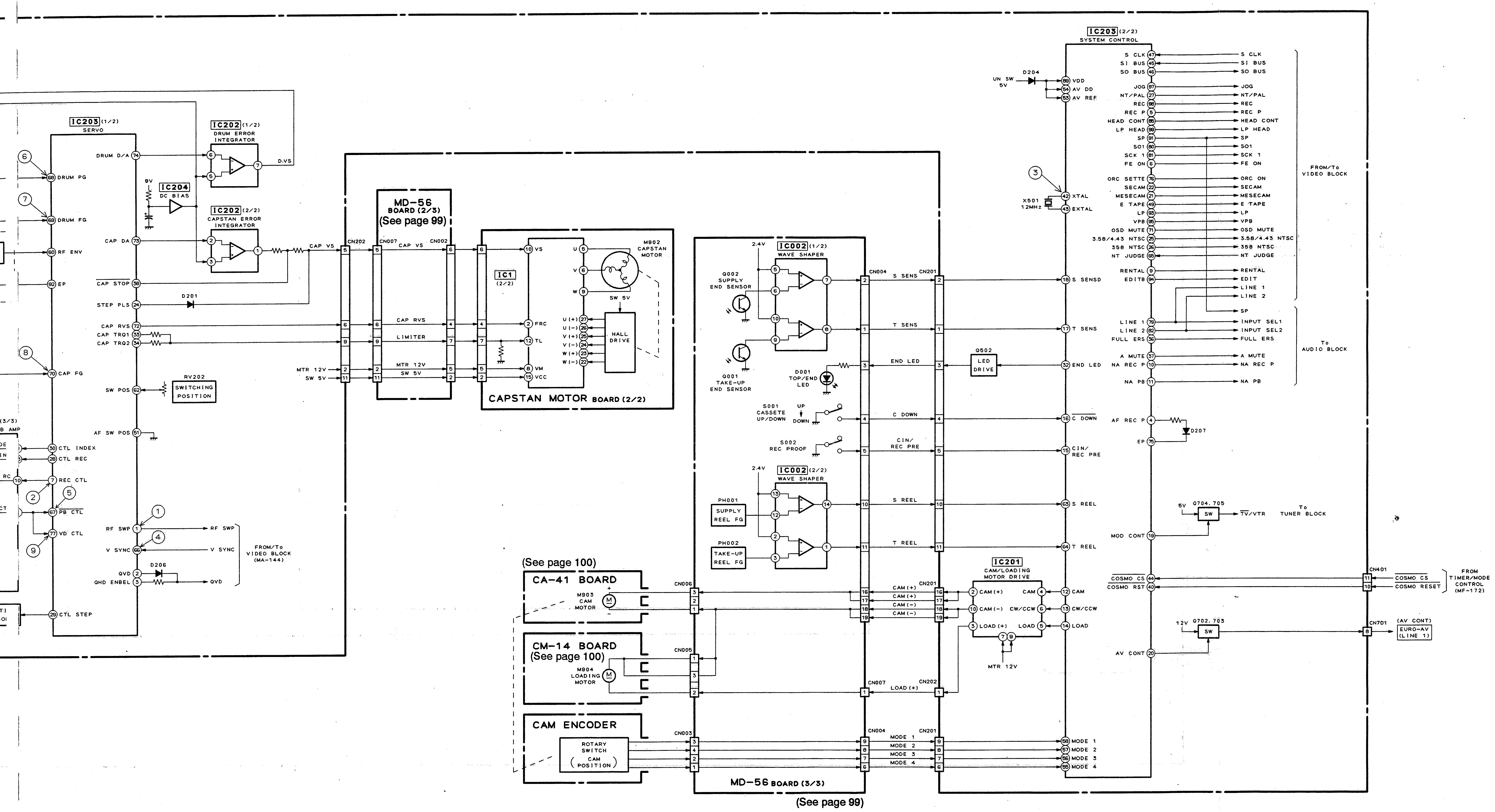
Pin No.	Port	I/O	Signal	Function
50	PF5/AN9	I	K MODE	Not used
51	PF4/AN8	I	AF SW POSI	VR input for hi-fi switching pulse position adjustment
52	AVss		AVss	GND
53	AVREF		AVREF	AD port reference input. UNSW 5 V
54	AVDD		AVDD	UNSW 5 V
55	PF3/AF7	I	MODE4	Mechanism section CAM encoder input
56	PF2/AN6	I	MODE3	
57	PF1/AN5	I	MODE2	
58	PF0/AN4	I	MODE1	
59	AN3	I	DEW	DEW sensor input
60	AN2	I	RF ENV	Video RF envelope input
61	AN1	I	AF ENV	hi-fi audio RF envelope input
62	AN0	I	RF SW POSI	VR input for SWP adjustment
63	PG7/EXI1	I	SREEL FG	S reel sensor input
64	PG6/EXI0	I	TREEL FG	T reel sensor input
65	PG5/SYNC1	I	NT JUDGE	3.58/4.43 NTSC judgement input
66	PG4/SYNC0	I	V SYNC	Composite sync input
67	PG3/$\overline{\text{PBCTL}}$	I	PB CTL	Playback CTL input
68	PG2/DPG	I	DRM PG	Drum PG input
69	PG1/DFG	I	DRM FG	Drum FG input
70	PG0/CFG	I	CAP FG	Capstan FG input
71	PE7/DAB1	O	OSD MUTE	Video putput mute signal
72	PE6/DAB0	O	CAP RVS	Capstan reverse signal output
73	PE5/DAA1	O	CAP D/A	Capstan error D/A output
74	PE4/DAA0	O	DRM D/A	Drum error D/A output
75	PE3/PWM1	O	$\overline{\text{EP}}$	"L" when EP mode REC/PB
76	PE2/PWM0	O	ORC SETTEI	"H" when ORC measurement
77	PE1/EC/INT	I	VD CTL	Playback CTL input
78	PE0/INT0	I	AMS IN	Not used
79	PI7/SIL	O	LINE1	Video/audio input select signal
80	PI6/SOL	O	EXP SO	Expansion port serial communication
81	PI5/$\overline{\text{SCKL}}$	O	EXP CLK	
82	PI4/INT1	O	LINE2	Video/audio input select signal
83	PI3/TO	I/O	$\overline{\text{Hi/Fi}}$/M/N	Audio output control signal
84	PI2/PWM	I/O	STEREO/L/$\overline{\text{R}}$	
85	PI1/PO	I/O	HEAD CONT	Head select control
86	TEX	I		Not used
87	TX	O		Not used
88	Vss			GND
89	VDD			UNSW 5 V
90	N.C.			Connected to UNSW 5 V
91	PA7/PPO7	O	$\overline{\text{SP}}$	"L" when SP mode
92	PA6/PPO6	O	ENV GAIN	RF envelope gain control
93	PA5/PPO5	O	LP	"H" when LP mode
94	PA4/PPO4	O	EDIT	"H" when EDIT
95	PA3/PPO3	O	$\overline{\text{V PB}}$	"L" when video playback
96	PA2/PPO2	O	AF PB	"H" when hi-fi audio playback
97	PA1/PPO1	O	JOG	"H" when trick play mode
98	PA0/PPO0	O	REC	Rise up signal of head amp recording power
99	PB7/PPO15	O	LP HEAD	(PAL) Head select control
100	PB6/PPO14	O	AF SWP	hi-fi switching pulse output

3-12. SERVO, SYSTEM CONTROL BLOCK DIAGRAM

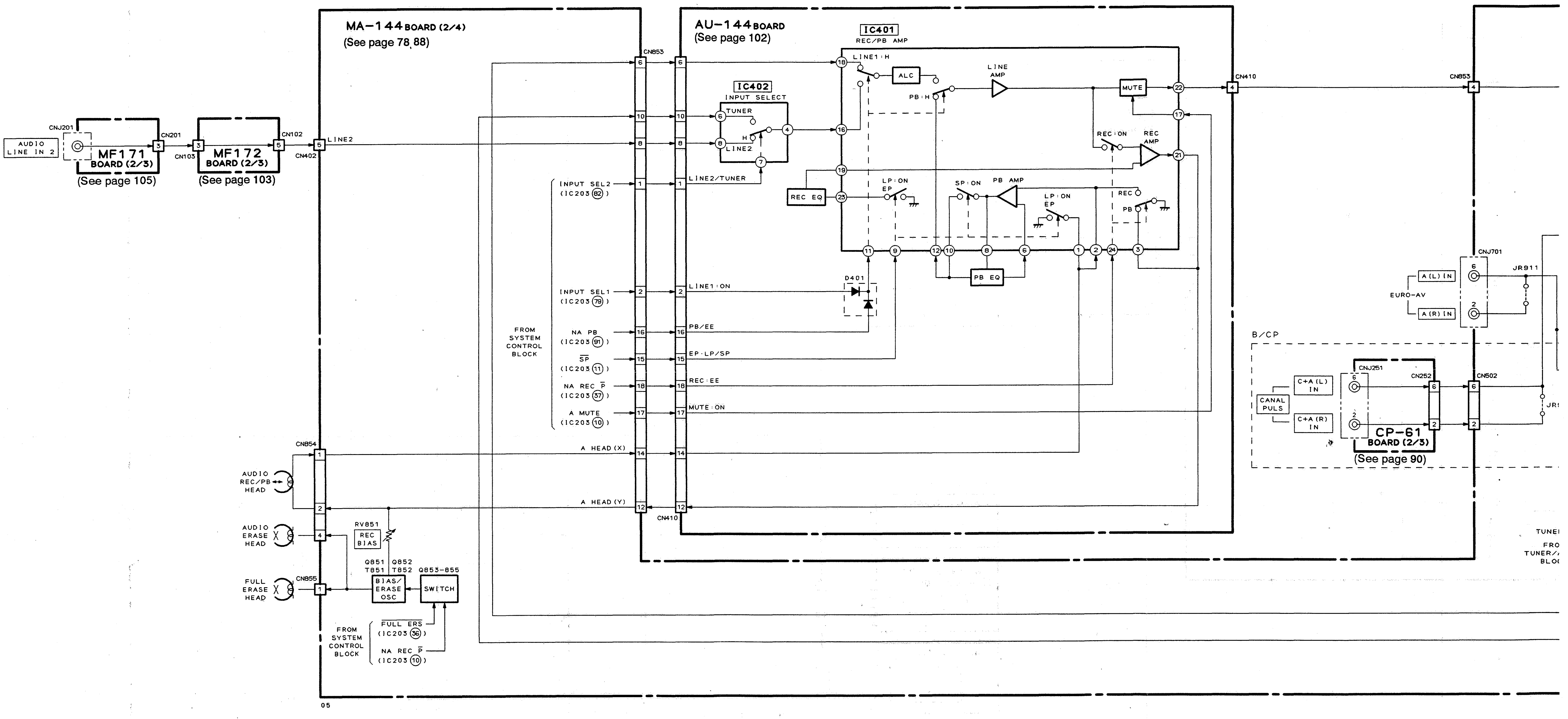
- Circled numbers refer to waveforms on page 87 for MA-144 board.

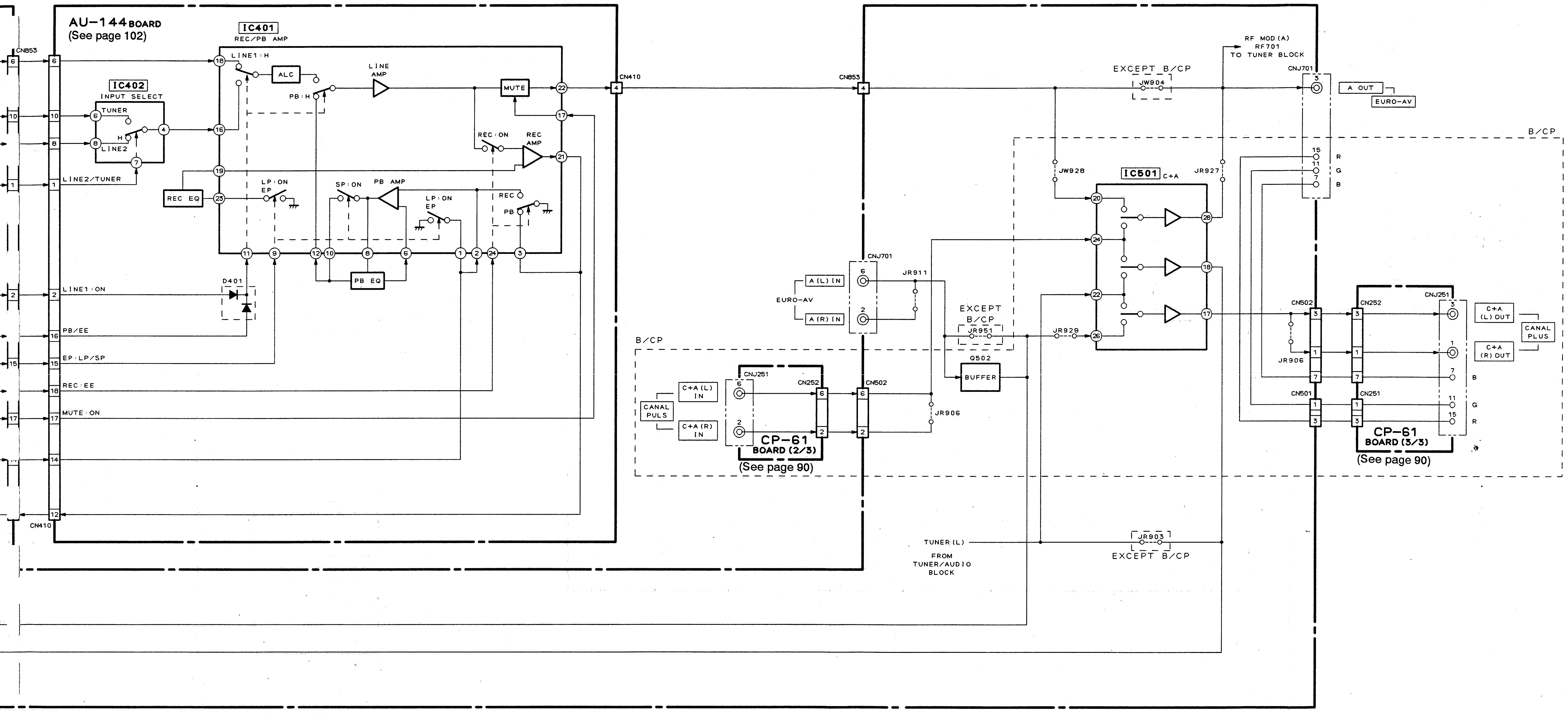


MA-144 BOARD (3/4)
(See page 78, 88)
DRUM MOTOR BOARD
M1
M2
M3
HALL DEVICE
HE+
HE-
Vcc
CAPSTAN MOTOR BOARD (1/2)
IC1 (1/2)
RM1
CAPSTAN FG SENSOR
MD-56 BOARD (1/3)
(See page 99)
CN001
CN002
CAP FG
IC001
DRUM FG/PG DET
FG/PG
ETR
ET/DS
SW 5V
IC003
FG/PG SEP
D PG
D FG
D VS
REF 2.5V
CN007
CN202
TRACKING DETECTOR
Q101
Q103, 105
Q107
AMP
BUFF
ENV DET
Q102
GAIN SW
PB C FROM VIDEO BLOCK (MA-144)
IC101 (2/3)
CAPSTAN FG AMP
IC203 (1/2)
SERVO
DRUM PG
DRUM FG
RF ENV
EP
CAP FG
DRUM D/A
CAP DA
CAP STOP
STEP PLS
CAP RVS
CAP TRQ1
CAP TRQ2
SW POS
AF SW POS
CTL INDEX
CTL REC
REC CTL
PB CTL
VD CTL
RF SWP
V SYNC
QVD
QHD ENBEL
CTL STEP
IC202 (1/2)
DRUM ERROR INTEGRATOR
IC204
DC BIAS
9V
IC202 (2/2)
CAPSTAN ERROR INTEGRATOR
D.VS
CAP VS
D201
D206
RV202
SWITCHING POSITION
FROM/TO VIDEO BLOCK (MA-144)
IC101 (3/3)
CTL REC/PB AMP
SV 5V
VCC
INDEX
REC INH
REC CTL GEN
TIMING GEN
PB
3 VALUE DET (H/L) REC CTL OPEN PB
RC
CTL HEAD
CN101
CTL (Y)
CTL (X)
PB CTL AMP
GCA
LEVEL DET
PB CTL LOGIC
CTL
BIAS 2.4V
PEAK DET
RTG MMV
DC (24V)
AMP GAIN
FOR CHECK
TIME CONST
MD-56 BOARD (2/3)
(See page 99)
CAP VS
CAP RVS
LIMITER
MTR 12V
SW 5V
CN002
CAPSTAN MOTOR BOARD (2/2)
IC1 (2/2)
VS
FRC
TL
VM
VCC
U
V
W
U(+)
U(-)
V(+)
V(-)
W(+)
W(-)
M902 CAPSTAN MOTOR
HALL DRIVE
IC002 (1/2)
WAVE SHAPER
2.4V
Q002 SUPPLY END SENSOR
Q001 TAKE-UP END SENSOR
D001 TOP/END LED
S001 CASSETE UP/DOWN
UP
DOWN
S002 REC PROOF
IC002 (2/2)
WAVE SHAPER
PH001 SUPPLY REEL FG
PH002 TAKE-UP REEL FG
CN004
CN006
CN005
CN003
CN007
(See page 100)
CA-41 BOARD
M903 CAM MOTOR
CM-14 BOARD
(See page 100)
M904 LOADING MOTOR
CAM ENCODER
ROTARY SWITCH (CAM POSITION)
MD-56 BOARD (3/3)
(See page 99)


IC203 (1/2)
SERVO
DRUM D/A 74
68 DRUM PG
69 DRUM FG
60 RF ENV
92 EP
CAP DA 73
CAP STOP 38
STEP PLS 24
CAP RVS 72
CAP TRQ1 33
CAP TRQ2 34
70 CAP FG
SW POS 62
AF SW POS 51
30 CTL INDEX
28 CTL REC
7 REC CTL
67 PB CTL
77 VD CTL
29 CTL STEP
RF SWP 1
V SYNC 66
QVD 2
QHD ENBEL 3
D206
RF SWP
V SYNC
QVD
FROM/To VIDEO BLOCK (MA-144)
(3/3)
B AMP
RC
IC202 (1/2)
DRUM ERROR INTEGRATOR
D.VS
IC204
DC BIAS
9V
IC202 (2/2)
CAPSTAN ERROR INTEGRATOR
CAP VS
D201
RV202
SWITCHING POSITION
MTR 12V
SW 5V
CN202
MD-56 BOARD (2/3)
(See page 99)
CN007
CN002
CAP VS
CAP RVS
LIMITER
MTR 12V
SW 5V
IC1 (2/2)
10 VS
2 FRC
12 TL
8 VM
15 VCC
U
V
W
U(+) U(−) V(+) V(−) W(+) W(−)
HALL DRIVE
SW 5V
M902
CAPSTAN MOTOR
CAPSTAN MOTOR BOARD (2/2)
IC002 (1/2)
WAVE SHAPER
2.4V
Q002
SUPPLY END SENSOR
Q001
TAKE-UP END SENSOR
D001
TOP/END LED
S001
CASSETE UP/DOWN
UP
DOWN
S002
REC PROOF
IC002 (2/2)
WAVE SHAPER
PH001
SUPPLY REEL FG
PH002
TAKE-UP REEL FG
CN004
CN201
S SENS
T SENS
END LED
C DOWN
CIN/ REC PRE
S REEL
T REEL
(See page 100)
CA-41 BOARD
M903
CAM MOTOR
CN006
CAM (+)
CAM (+)
CAM (−)
CAM (−)
CM-14 BOARD
(See page 100)
M904
LOADING MOTOR
CN005
CN007
CN202
LOAD (+)
CAM ENCODER
ROTARY SWITCH
(CAM POSITION)
CN003
CN004
CN201
MODE 1
MODE 2
MODE 3
MODE 4
MD-56 BOARD (3/3)
(See page 99)
Q502
LED DRIVE
IC201
CAM/LOADING MOTOR DRIVE
2 CAM (+)
10 CAM (−)
3 LOAD (+)
CAM 4
CW/CCW 6
LOAD 5
7 9
MTR 12V
IC203 (2/2)
SYSTEM CONTROL
UN SW 5V
D204
89 VDD
54 AV DD
53 AV REF
42 XTAL
43 EXTAL
X501 12MHz
18 S SENSD
17 T SENS
32 END LED
16 C DOWN
15 CIN/ REC PRE
63 S REEL
64 T REEL
12 CAM
13 CW/CCW
14 LOAD
58 MODE 1
57 MODE 2
56 MODE 3
55 MODE 4
S CLK 47
SI BUS 45
SO BUS 46
JOG 97
NT/PAL 27
REC 98
REC P 5
HEAD CONT 85
LP HEAD 99
SP 91
SO1 80
SCK 1 81
FE ON 6
ORC SETTE 76
SECAM 22
MESECAM 21
E TAPE 49
LP 93
VPB 95
OSD MUTE 71
3.58/4.43 NTSC 25
358 NTSC 26
NT JUDGE 65
RENTAL 9
EDITB 94
LINE 1 79
LINE 2 82
FULL ERS 36
A MUTE 37
NA REC P 10
NA PB 11
AF REC P 4
EP 75
D207
MOD CONT 19
AV CONT 20
COSMO CS 44
COSMO RST 40
S CLK
SI BUS
SO BUS
JOG
NT/PAL
REC
REC P
HEAD CONT
LP HEAD
SP
SO1
SCK 1
FE ON
ORC ON
SECAM
MESECAM
E TAPE
LP
VPB
OSD MUTE
3.58/4.43 NTSC
358 NTSC
NT JUDGE
RENTAL
EDIT
LINE 1
LINE 2
FROM/To VIDEO BLOCK
SP
INPUT SEL1
INPUT SEL2
FULL ERS
A MUTE
NA REC P
NA PB
To AUDIO BLOCK
5V Q704, 705
SW
TV/VTR
To TUNER BLOCK
CN401
COSMO CS
COSMO RESET
FROM TIMER/MODE CONTROL (MF-172)
12V Q702, 703
SW
CN701
(AV CONT)
EURO-AV (LINE 1)

3-13. AUDIO BLOCK DIAGRAM


MA-144 BOARD (2/4)
(See page 78, 88)
AU-144 BOARD
(See page 102)
AUDIO LINE IN 2
CNJ201
MF171 BOARD (2/3)
(See page 105)
CN201
CN103
MF172 BOARD (2/3)
(See page 103)
CN102
CN402
LINE2
CN853
IC402
INPUT SELECT
TUNER
H
LINE2
LINE2/TUNER
IC401
REC/PB AMP
LINE1 : H
ALC
LINE AMP
PB : H
MUTE
REC : ON
REC AMP
REC EQ
LP : ON
EP
SP : ON
PB AMP
LP : ON
EP
REC
PB
PB EQ
D401
CN410
INPUT SEL2
(IC203 (82))
INPUT SEL1
(IC203 (79))
FROM SYSTEM CONTROL BLOCK
NA PB
(IC203 (91))
SP
(IC203 (11))
NA REC P
(IC203 (57))
A MUTE
(IC203 (10))
LINE1 : ON
PB/EE
EP·LP/SP
REC : EE
MUTE : ON
A HEAD (X)
A HEAD (Y)
CN854
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
CN855
RV851
REC BIAS
Q851 Q852
T851 T852
Q853-855
BIAS/ERASE OSC
SWITCH
FROM SYSTEM CONTROL BLOCK
FULL ERS
(IC203 (36))
NA REC P
(IC203 (10))
05
CNJ701
JR911
A (L) IN
EURO-AV
A (R) IN
B/CP
CANAL PULS
C+A (L) IN
C+A (R) IN
CNJ251
CN252
CP-61 BOARD (2/3)
(See page 90)
CN502
TUNER
FRO
TUNER/
BLO


AU-144 BOARD
(See page 102)
IC401
REC/PB AMP
IC402
INPUT SELECT
TUNER
LINE2
LINE1 : H
ALC
PB : H
LINE AMP
MUTE
REC : ON
REC AMP
LP : ON
EP
SP : ON
PB AMP
LP : ON
EP
REC
PB
REC EQ
PB EQ
D401
LINE2/TUNER
LINE1 : ON
PB/EE
EP · LP/SP
REC : EE
MUTE : ON
CN853
CN410
EXCEPT B/CP
JW904
RF MOD (A)
RF701
TO TUNER BLOCK
CNJ701
A OUT
EURO-AV
B/CP
JW928
IC501 C+A
JR927
R
G
B
CNJ701
A (L) IN
A (R) IN
EURO-AV
JR911
EXCEPT B/CP
JR951
JR929
Q502
BUFFER
JR906
B/CP
CANAL PULS
C+A (L) IN
C+A (R) IN
CNJ251
CN252
CN502
CP-61
BOARD (2/3)
(See page 90)
CN502
CN252
CNJ251
C+A (L) OUT
C+A (R) OUT
CANAL PLUS
JR906
CN501
CN251
CP-61
BOARD (3/3)
(See page 90)
TUNER (L)
FROM TUNER/AUDIO BLOCK
JR903
EXCEPT B/CP

3-14. TIMER, TUNER MODE CONTROL MICROCOMPUTER PIN FUNCTION (MF-172 BOARD IC101 MB89905-VSX1910)

No.	Port Name	I/O	Signal Name	Contents
1	CL1		32K X'tal	Connect oscillator for clock
2	CL0		32K X'tal	Connect oscillator for clock
3	MOD0		GND	
4	MOD1		GND	
5	X0		X'tal	Connect main oscillator
6	X1		X'tal	Connect main oscillator
7	Vss		GND	
8	XRST	I	$\overline{\text{RESET}}$	Reset signal input
9	P00/E120	O	PLL ENABLE	Tuner enable signal
10	P01/E121	O	PLL DATA	Tuner data signal
11	P02/E122	O	PLL CLOCK	Tuner clock signal
12	P03/E123	O	SYS2/$\overline{\text{VPS CS}}$/$\overline{\text{PD CCS}}$	Tuner system select signal 2 (E7B) VPS chip select (E7VP), PDC chip select (E7AP/UY/E8UV)
13	P04/E124	O	SYS1/$\overline{\text{VPS RST}}$/$\overline{\text{PDC RST}}$	Tuner system select signal 1 (E7B) VPS reset (E7VP), PDC reset (E7AP/UY/E8UV)
14	P05/E125	O	$\overline{\text{COSMO CS}}$	System control chip select signal
15	P06/E126	O	$\overline{\text{COSMO RESET}}$	System control reset signal
16	P07/E127	O	$\overline{\text{CG CS}}$	Character generator chip select signal
17	P10/E110	I	$\overline{\text{POWER FAIL}}$	Power failure detect signal input
18	P11/E111	I	$\overline{\text{V SYNC}}$	V sync. signal input
19	P12/E112	I	H DET	Video signal detect signal input
20	P13/E113	I	C+ DET	CANAL +detection
21	P14	O	C+ DATA	CANAL +control data
22	P15	O	C+ CLK	CANAL +control clock
23	P16	I	SCL	I^2C BUS (Clock)
24	P17	I	SDA	I^2C BUS (Data)
25	P20	O	$\overline{\text{STEREO}}$	Stereo, bilingual, HiFi LED
26	P21	O	$\overline{\text{TIMER}}$	TIMER LED
27	P22	O	$\overline{\text{REC}}$	REC LED
28	CMOD		GND	
29	P24/SI0	O	FF	FF LED
30	P25/SO0	O	FWD	FWD LED
31	P26/SCLK0	O	PAUSE	PAUSE LED
32	P27/RMCI	I	SIRCS IN	SIRCS signal input
33	P30	O	RVS	RVS LED
34	P31	O	REW	REW LED
35	P32	O	H. S. REW	H. S. REW LED

No.	Port Name	I/O	Signal Name	Contents
36	P33/PWMO	O	SAP/$\overline{\text{MAIN}}$	Not used
37	P34/PPGO	O	N. C.	
38	P35/PPGI	O	POWER CONT	Power ON/OFF control signal
39	FS00	O	S16	FDP Segment 16
40	FS01	O	S15	FDP Segment 15
41	FS02	O	S14	FDP Segment 14
42	FS03	O	S13	FDP Segment 13
43	FS04	O	S12	FDP Segment 12
44	FS05	O	S11	FDP Segment 11
45	FS06	O	S10	FDP Segment 10
46	FS07	O	S09	FDP Segment 9
47	FS08	O	S08	FDP Segment 8
48	FS09	O	S07	FDP Segment 7
49	Vcc	O	5V	
50	FS10	O	S06	FDP Segment 6
51	FS11	O	S05	FDP Segment 5
52	FS12	O	S04	FDP Segment 4
53	Vfdp		−30V	
54	FS13	O	S03	FDP Segment 3
55	FS14	O	S02	FDP Segment 2
56	FS15	O	S01	FDP Segment 1
57	FS16		N. C.	
58	Vss		GND	
59	FS17		N. C.	
60	FS18		N. C.	
61	FS19		N. C.	
62	FC10/FS20		N. C.	
63	FC10/FS21		N. C.	
64	FC09/FS22		N. C.	
65	FC08/FS23		N. C.	
66	FC07	O	1G	FDP Grid 1
67	Vcc		5V	
68	FC06	O	2G	FDP Grid 2
69	FC05	O	3G	FDP Grid 3
70	FC04	O	4G	FDP Grid 4

No.	Port Name	I/O	Signal Name	Contents
71	FC03	O	5G	FDP Grid 5
72	FC02	O	6G	FDP Grid 6
73	FC01	O	7G	FDP Grid 7
74	FC00		N. C.	
75	P80/STB	O	A INSERT	A INSERT LED
76	P81/XCS	O	V INSERT	Not used
77	P82/SI1	I	SO BUS	Serial data input
78	P83/SO1	O	SI BUD	Serial data input
79	P84/SCLK1	O	S CLK	Clock for serial communication
80	P85/ECK	O	MEM CS	E²PROM chip seelct signal
81	P86/T01	O	MEM CLK	E²PROM clock
82	P87/T02	O	MEM DATA	E²PROM data
83	AVss		GND	
84	P90/AN00	I	A/D0	Key reading A/D input
85	P91/AN01	I	A/D1	Key reading A/D input
86	P92/AN02	I	A/D2	Key reading A/D input
87	P93/AN03	I	A/D3	Key reading A/D input
88	P94/AN04	I	A/D4	Key reading A/D input
89	P95/AN05	I	A/D5	Key reading A/D input
90	P96/AN06	I	A/D6	Key reading A/D input
91	P97/AN07	O	APC	APC LED
92	AVcc		5V	
93	PA0/AN08		N. C.	
94	PA1/AN09		DEST1	Destination discriminating A/D input
95	PA2/AN10	I	DEST2	Destination discriminating A/D input
96	PA3/AN11	I	AFT	Tuner AFT input
97	PA4/LSI	O	F MONO	Not used
98	PA5/LSO	O	AUTO RESET	Not used
99	PA6/COUT	O	BUZZER	Buzzer output
100	Vcc		5V	

A/D Port Assignment

Level Port	SW0	SW1	SW2	SW3	SW4	SW5	SW6
AN00	POWER	EJECT					
AN01							
AN02	STOP	REC	PLAY	INPUT SEL	PROGRAM (+)	PROGRAM (−)	TV/VTR (AS MODEL)
AN03	FWD/RVS	PAUSE	H. S. REW			EDIT	RENTAL
AN04	RING2	TIMER REC ON/OFF			COLOR SEL0	COLOR SEL1	COLOR SEL2
AN05	RING1					NTSC PB SEL0	NTSC PB SEL1
AN06	RING0	TEST	X120 (TEST)		APC		
AN07							
AN08							
AN09	DESTINATION						
AN10							
AN11	AFT						

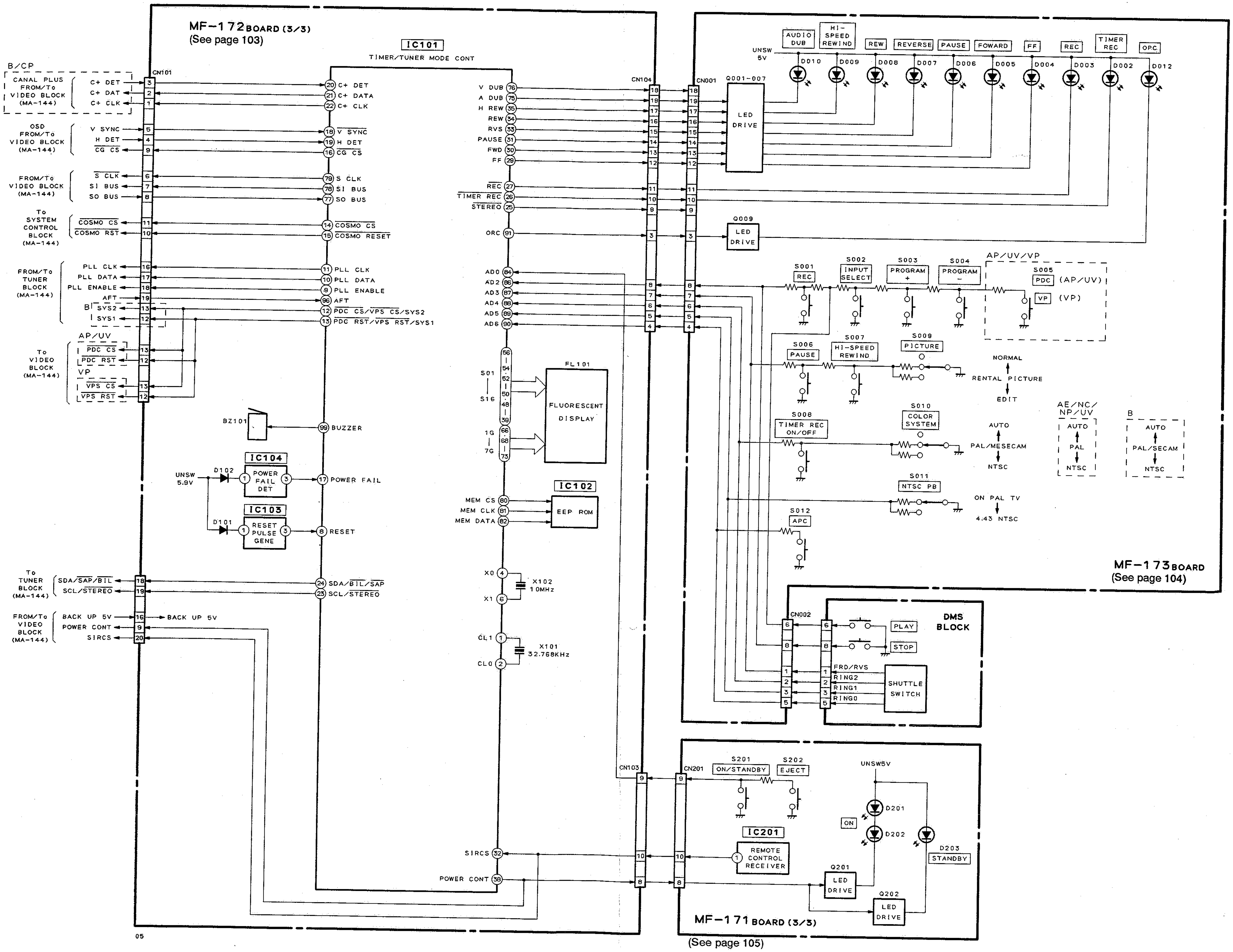
COLOR SELECT SWITCH

MODE SWITCH	NTSC	PAL	SECAM	AUTO
COLOR SEL0	on	off		off
COLOR SEL1	off	on		off
COLOR SEL2	off	off		off

NTSC PB SELECT SWITCH

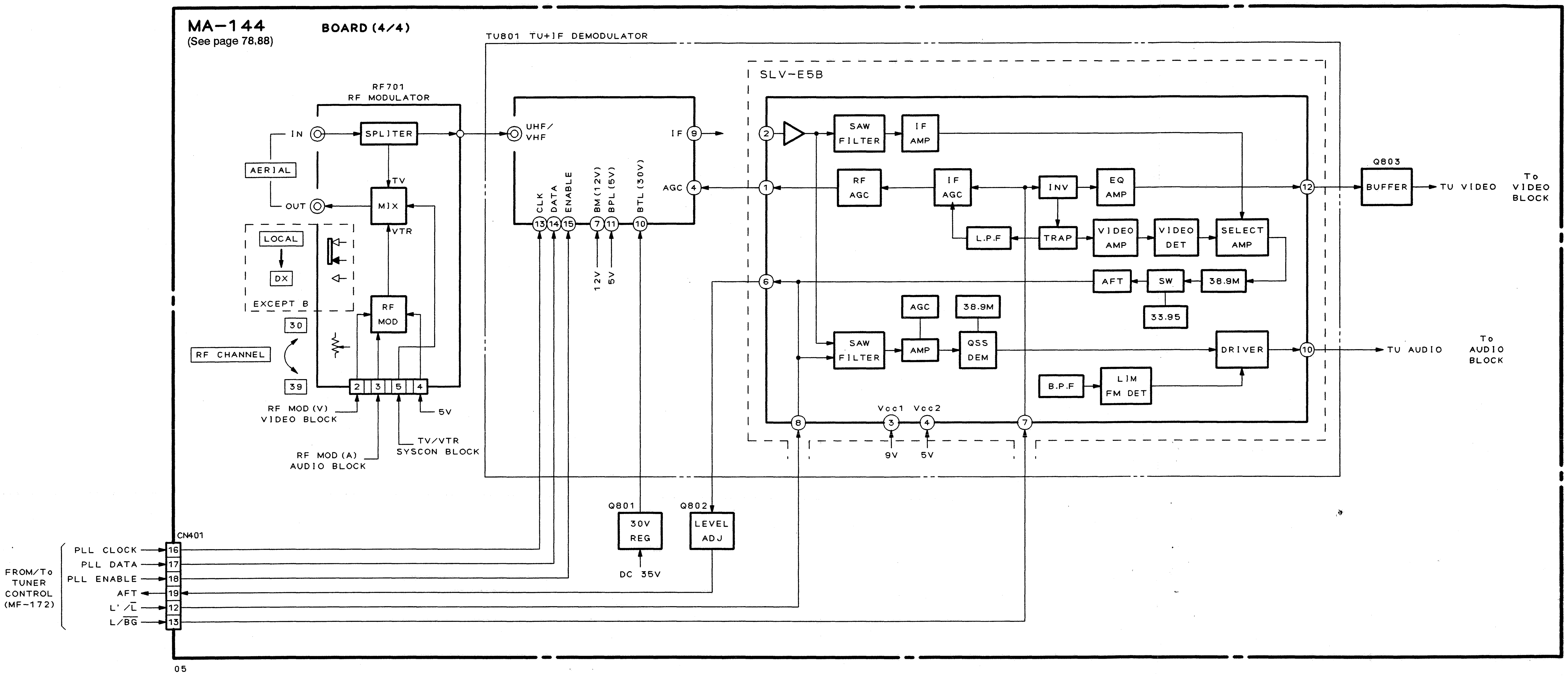
MODE SWITCH	ON PAL TV	4.43 NTSC
NTSC PB SEL0	on	off
NTSC PB SEL1	off	on

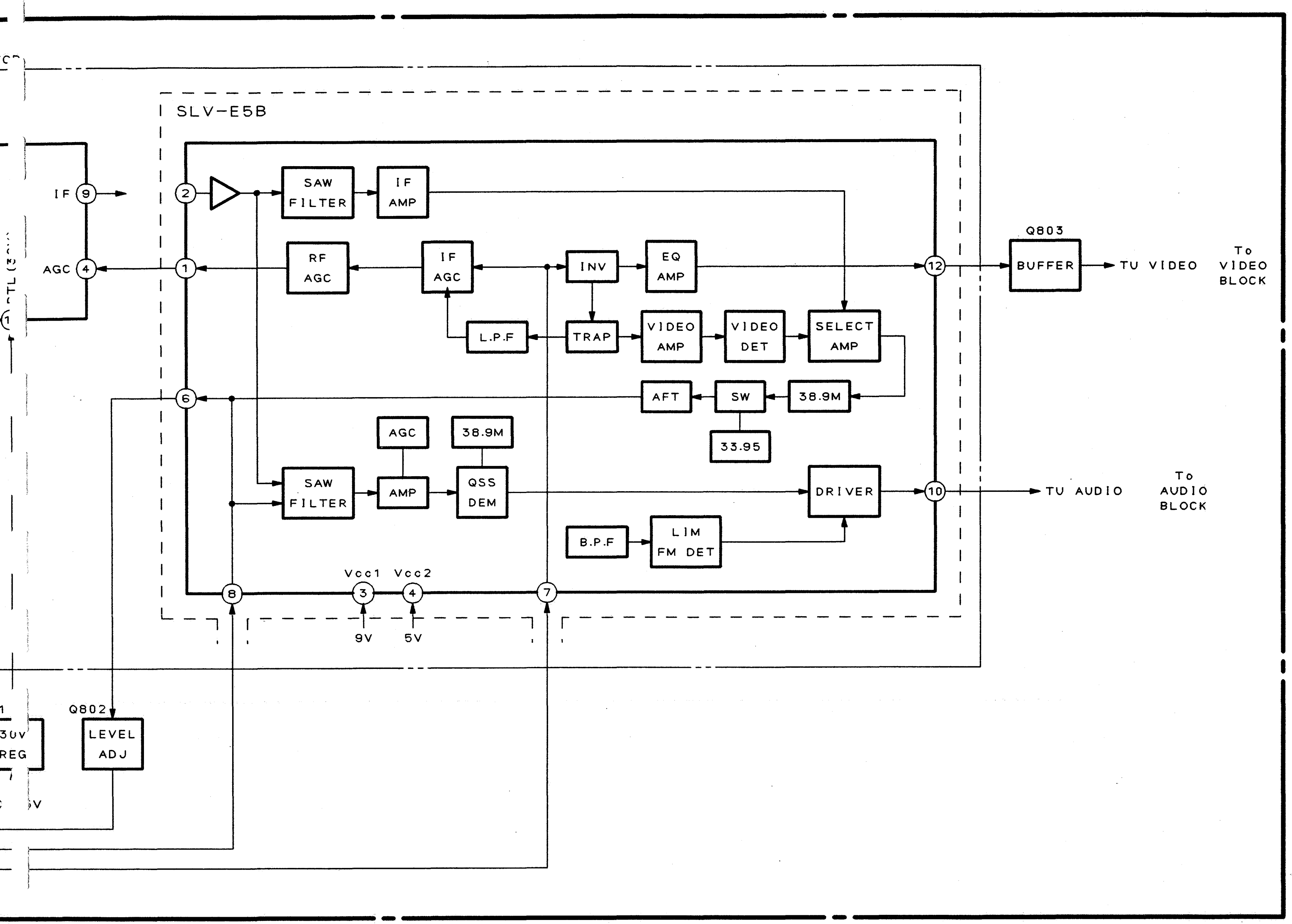
3-15. TIMER, TUNER, MODE CONTROL BLOCK DIAGRAM

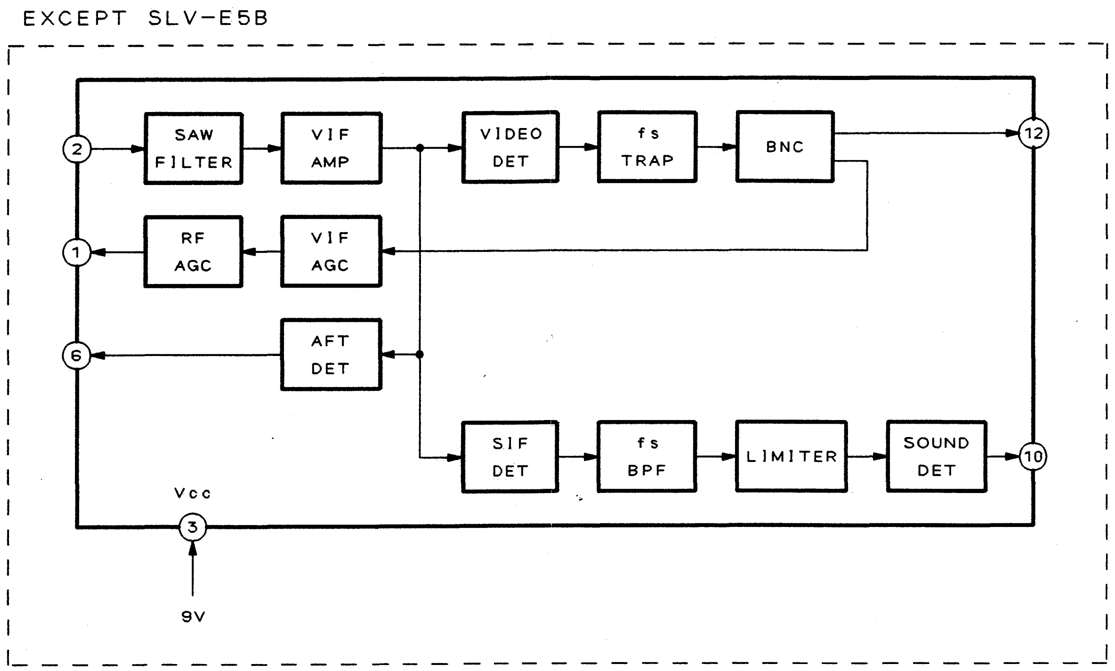


MF-172 BOARD (3/3)
(See page 103)
IC101
TIMER/TUNER MODE CONT
B/CP
CANAL PLUS FROM/To VIDEO BLOCK (MA-144)
C+ DET
C+ DAT
C+ CLK
CN101
20 C+ DET
21 C+ DATA
22 C+ CLK
OSD FROM/To VIDEO BLOCK (MA-144)
V SYNC
H DET
CG CS
18 V SYNC
19 H DET
16 CG CS
FROM/To VIDEO BLOCK (MA-144)
S CLK
SI BUS
SO BUS
79 S CLK
78 SI BUS
77 SO BUS
To SYSTEM CONTROL BLOCK (MA-144)
COSMO CS
COSMO RST
14 COSMO CS
15 COSMO RESET
FROM/To TUNER BLOCK (MA-144)
PLL CLK
PLL DATA
PLL ENABLE
AFT
B SYS2
SYS1
11 PLL CLK
10 PLL DATA
9 PLL ENABLE
96 AFT
12 PDC CS/VPS CS/SYS2
13 PDC RST/VPS RST/SYS1
AP/UV
To VIDEO BLOCK (MA-144)
PDC CS
PDC RST
VP
VPS CS
VPS RST
BZ101
99 BUZZER
IC104
POWER FAIL DET
UNSW 5.9V
D102
17 POWER FAIL
IC103
RESET PULSE GENE
D101
8 RESET
To TUNER BLOCK (MA-144)
SDA/SAP/BIL
SCL/STEREO
24 SDA/BIL/SAP
23 SCL/STEREO
FROM/To VIDEO BLOCK (MA-144)
BACK UP 5V
POWER CONT
SIRCS
BACK UP 5V
V DUB 76
A DUB 75
H REW 35
REW 34
RVS 33
PAUSE 31
FWD 30
FF 29
REC 27
TIMER REC 26
STEREO 25
ORC 91
AD0 84
AD2 86
AD3 87
AD4 88
AD5 89
AD6 90
S01
S16
56 54 52 50 48 39
1G
7G
66 68 73
FL101
FLUORESCENT DISPLAY
IC102
MEM CS 80
MEM CLK 81
MEM DATA 82
EEP ROM
X0 4
X1 6
X102 10MHz
CL1 1
CL0 2
X101 32.768KHz
SIRCS 32
POWER CONT 38
CN104
CN103
05
MF-173 BOARD
(See page 104)
CN001
Q001-007
LED DRIVE
UNSW 5V
AUDIO DUB
HI-SPEED REWIND
REW
REVERSE
PAUSE
FOWARD
FF
REC
TIMER REC
OPC
D010
D009
D008
D007
D006
D005
D004
D003
D002
D012
Q009
LED DRIVE
S001 REC
S002 INPUT SELECT
S003 PROGRAM +
S004 PROGRAM −
AP/UV/VP
S005 PDC (AP/UV)
VP (VP)
S006 PAUSE
S007 HI-SPEED REWIND
S009 PICTURE
NORMAL
RENTAL PICTURE
EDIT
S008 TIMER REC ON/OFF
S010 COLOR SYSTEM
AUTO
PAL/MESECAM
NTSC
AE/NC/NP/UV
AUTO
PAL
NTSC
B
AUTO
PAL/SECAM
NTSC
S011 NTSC PB
ON PAL TV
4.43 NTSC
S012 APC
CN002
DMS BLOCK
PLAY
STOP
FRD/RVS
RING2
RING1
RING0
SHUTTLE SWITCH
MF-171 BOARD (3/3)
(See page 105)
CN201
S201 ON/STANDBY
S202 EJECT
UNSW5V
D201
ON
D202
D203 STANDBY
IC201
REMOTE CONTROL RECEIVER
Q201 LED DRIVE
Q202 LED DRIVE

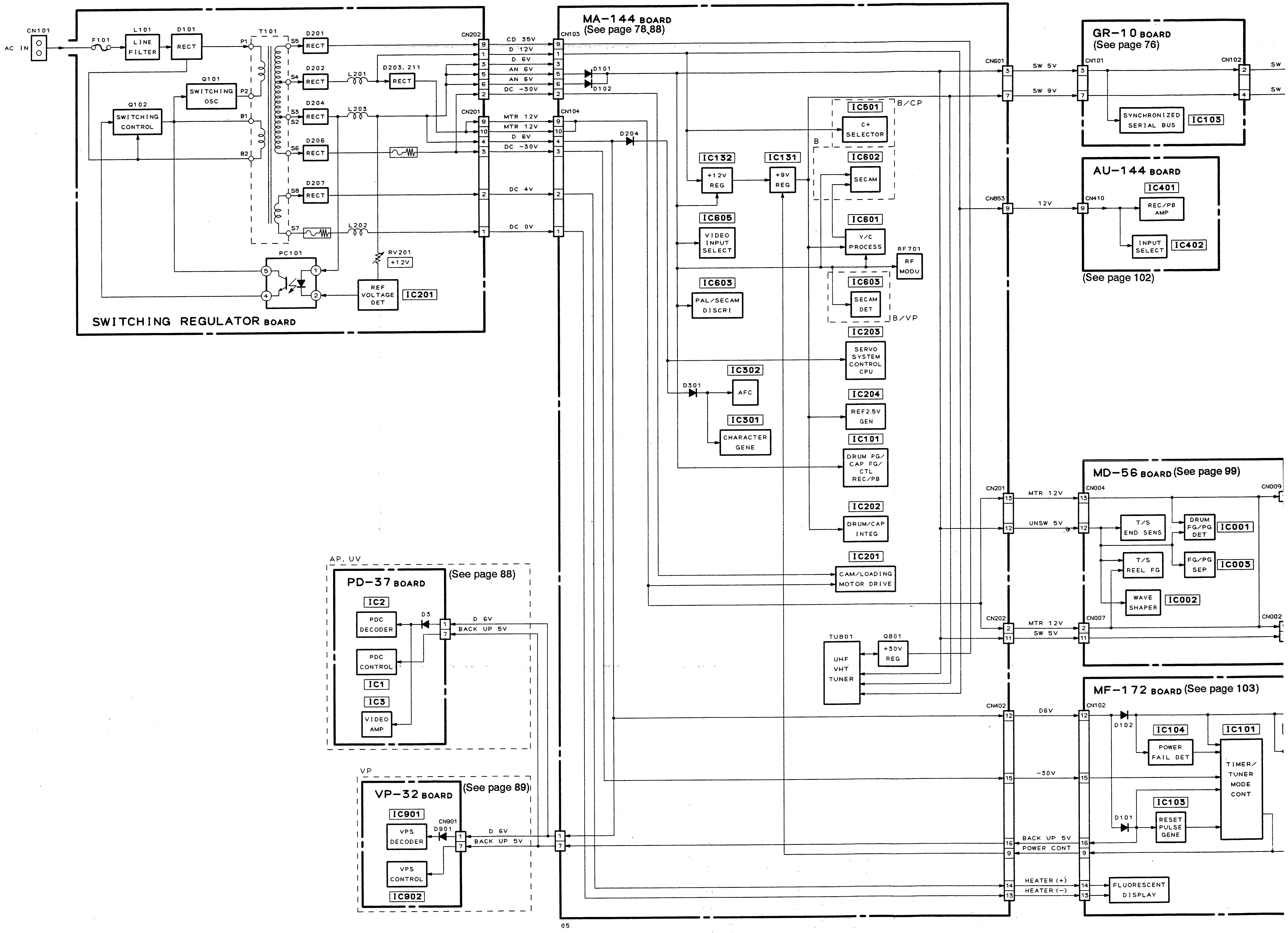
3-16. TUNER BLOCK DIAGRAM


MA-144
BOARD (4/4)
(See page 78,88)
TU801 TU+IF DEMODULATOR
SLV-E5B
RF701
RF MODULATOR
IN
OUT
AERIAL
SPLITER
TV
MIX
VTR
LOCAL
DX
EXCEPT B
RF
MOD
RF CHANNEL
30
39
2 3 5 4
RF MOD (V)
VIDEO BLOCK
5V
TV/VTR
SYSCON BLOCK
RF MOD (A)
AUDIO BLOCK
UHF/
VHF
IF 9
AGC 4
CLK
DATA
ENABLE
BM (12V)
BPL (5V)
BTL (30V)
13 14 15 7 11 10
12V
5V
SAW
FILTER
IF
AMP
RF
AGC
IF
AGC
INV
EQ
AMP
L.P.F
TRAP
VIDEO
AMP
VIDEO
DET
SELECT
AMP
AFT
SW
38.9M
33.95
AGC
38.9M
SAW
FILTER
AMP
QSS
DEM
DRIVER
B.P.F
LIM
FM DET
Vcc1 Vcc2
2 1 6 8 3 4 7 12 10
9V
5V
Q803
BUFFER
TU VIDEO
To
VIDEO
BLOCK
TU AUDIO
To
AUDIO
BLOCK
Q801
30V
REG
DC 35V
Q802
LEVEL
ADJ
CN401
FROM/To
TUNER
CONTROL
(MF-172)
PLL CLOCK 16
PLL DATA 17
PLL ENABLE 18
AFT 19
L'/L̄ 12
L/BG 13
05

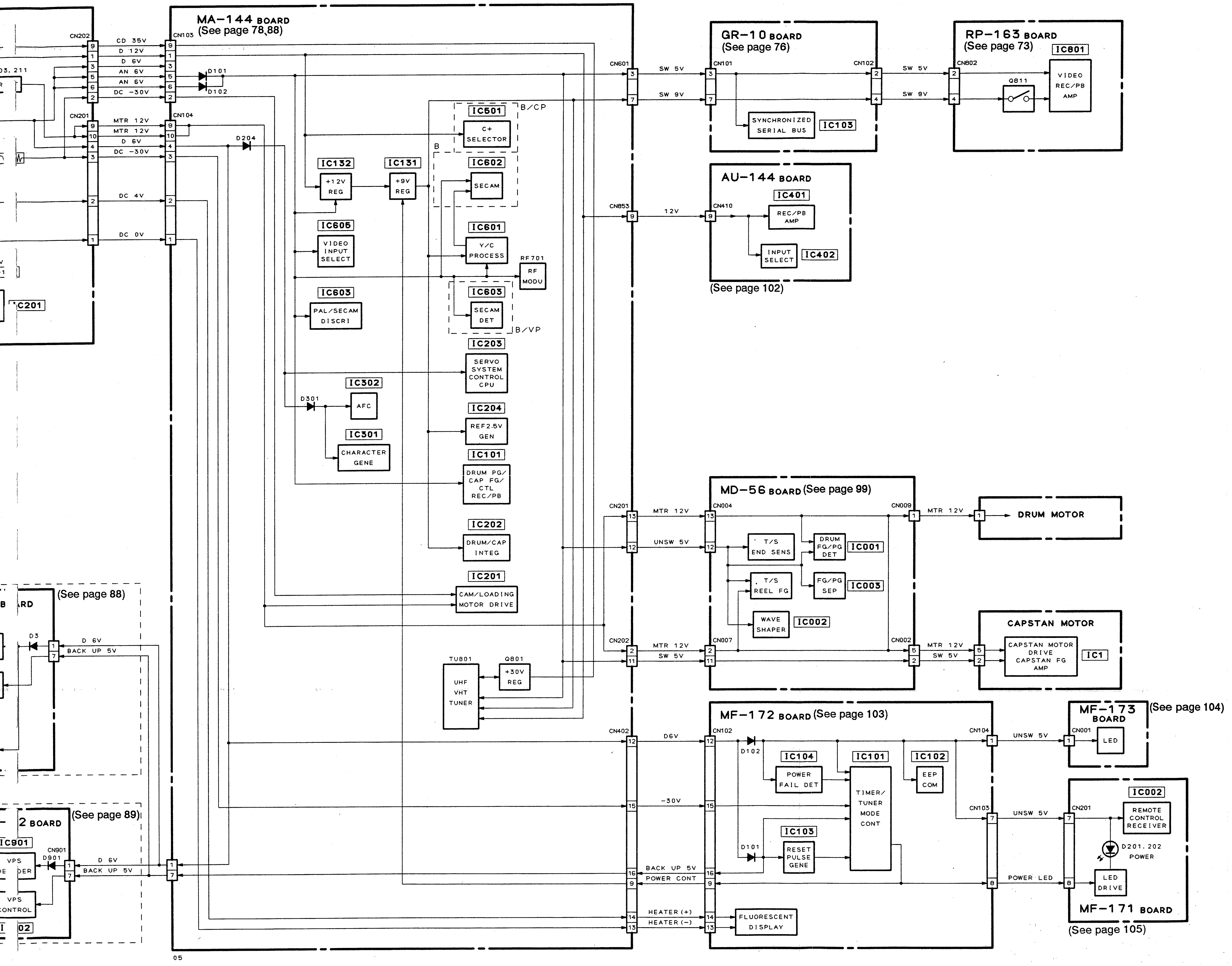

IF 9
AGC 4
1
SLV-E5B
2
SAW FILTER
IF AMP
1
RF AGC
IF AGC
INV
EQ AMP
12
Q803
BUFFER
TU VIDEO
To VIDEO BLOCK
L.P.F
TRAP
VIDEO AMP
VIDEO DET
SELECT AMP
6
AFT
SW
38.9M
33.95
AGC
38.9M
SAW FILTER
AMP
QSS DEM
DRIVER
10
TU AUDIO
To AUDIO BLOCK
B.P.F
LIM FM DET
8
Vcc1
Vcc2
3
4
7
9V
5V
Q802
LEVEL ADJ
30V REG


EXCEPT SLV-E5B
2
SAW FILTER
VIF AMP
VIDEO DET
fs TRAP
BNC
12
1
RF AGC
VIF AGC
6
AFT DET
SIF DET
fs BPF
LIMITER
SOUND DET
10
Vcc
3
9V

3-17. POWER BLOCK DIAGRAM



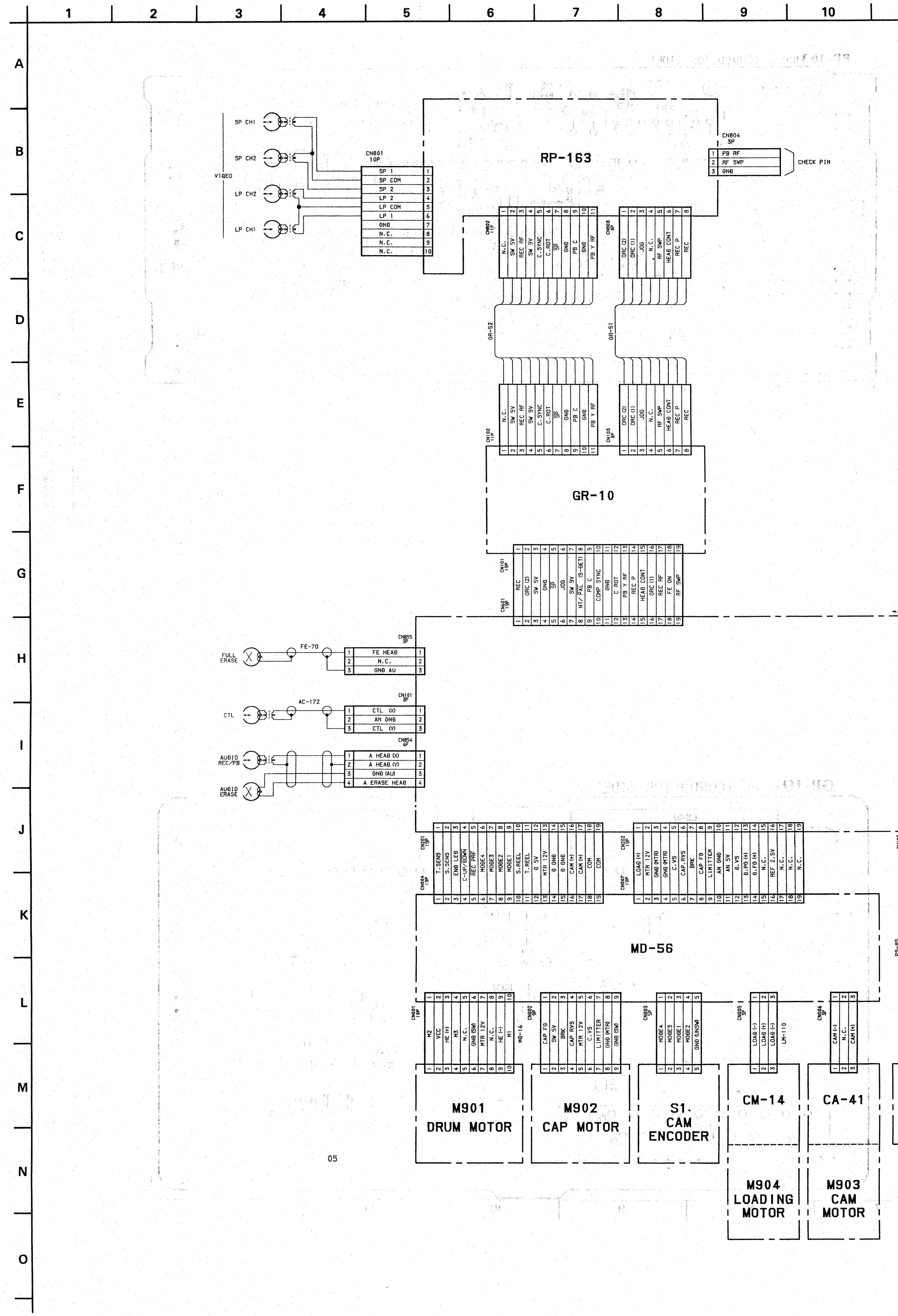
SWITCHING REGULATOR BOARD
AC IN
CN101
F101
L101
LINE FILTER
D101
RECT
T101
P1
P2
B1
B2
Q101
SWITCHING OSC
Q102
SWITCHING CONTROL
D201
D202
D203, 211
D204
D206
D207
S5
S4
S3
S2
S6
S8
S7
L201
L203
L202
RV201
+12V
PC101
REF VOLTAGE DET
IC201
CN202
CN201
CD 35V
D 12V
D 6V
AN 6V
AN 6V
DC -30V
MTR 12V
MTR 12V
D 6V
DC -30V
DC 4V
DC 0V
MA-144 BOARD
(See page 78,88)
CN103
CN104
D101
D102
D204
IC132
+12V REG
IC131
+9V REG
IC501
C+ SELECTOR
B/CP
B
IC602
SECAM
IC605
VIDEO INPUT SELECT
IC601
Y/C PROCESS
RF701
RF MODU
IC603
PAL/SECAM DISCRI
IC603
SECAM DET
B/VP
IC203
SERVO SYSTEM CONTROL CPU
IC302
D301
AFC
IC301
CHARACTER GENE
IC204
REF2.5V GEN
IC101
DRUM PG/ CAP FG/ CTL REC/PB
IC202
DRUM/CAP INTEG
IC201
CAM/LOADING MOTOR DRIVE
TU801
UHF VHT TUNER
Q801
+30V REG
CN601
SW 5V
SW 9V
CN853
12V
CN201
MTR 12V
UNSW 5V
CN202
MTR 12V
SW 5V
CN402
D6V
-30V
BACK UP 5V
POWER CONT
HEATER (+)
HEATER (−)
05
GR-10 BOARD
(See page 76)
CN101
CN102
SW
SW
SYNCHRONIZED SERIAL BUS
IC103
AU-144 BOARD
CN410
IC401
REC/PB AMP
INPUT SELECT
IC402
(See page 102)
MD-56 BOARD (See page 99)
CN004
CN009
T/S END SENS
DRUM FG/PG DET
IC001
T/S REEL FG
FG/PG SEP
IC003
WAVE SHAPER
IC002
CN007
CN002
MF-172 BOARD (See page 103)
CN102
D102
IC104
POWER FAIL DET
IC101
TIMER/ TUNER MODE CONT
D101
IC103
RESET PULSE GENE
FLUORESCENT DISPLAY
AP, UV
PD-37 BOARD
(See page 88)
IC2
PDC DECODER
D3
PDC CONTROL
IC1
IC3
VIDEO AMP
D 6V
BACK UP 5V
VP
VP-32 BOARD
(See page 89)
IC901
VPS DECODER
CN901
D901
VPS CONTROL
IC902
D 6V
BACK UP 5V

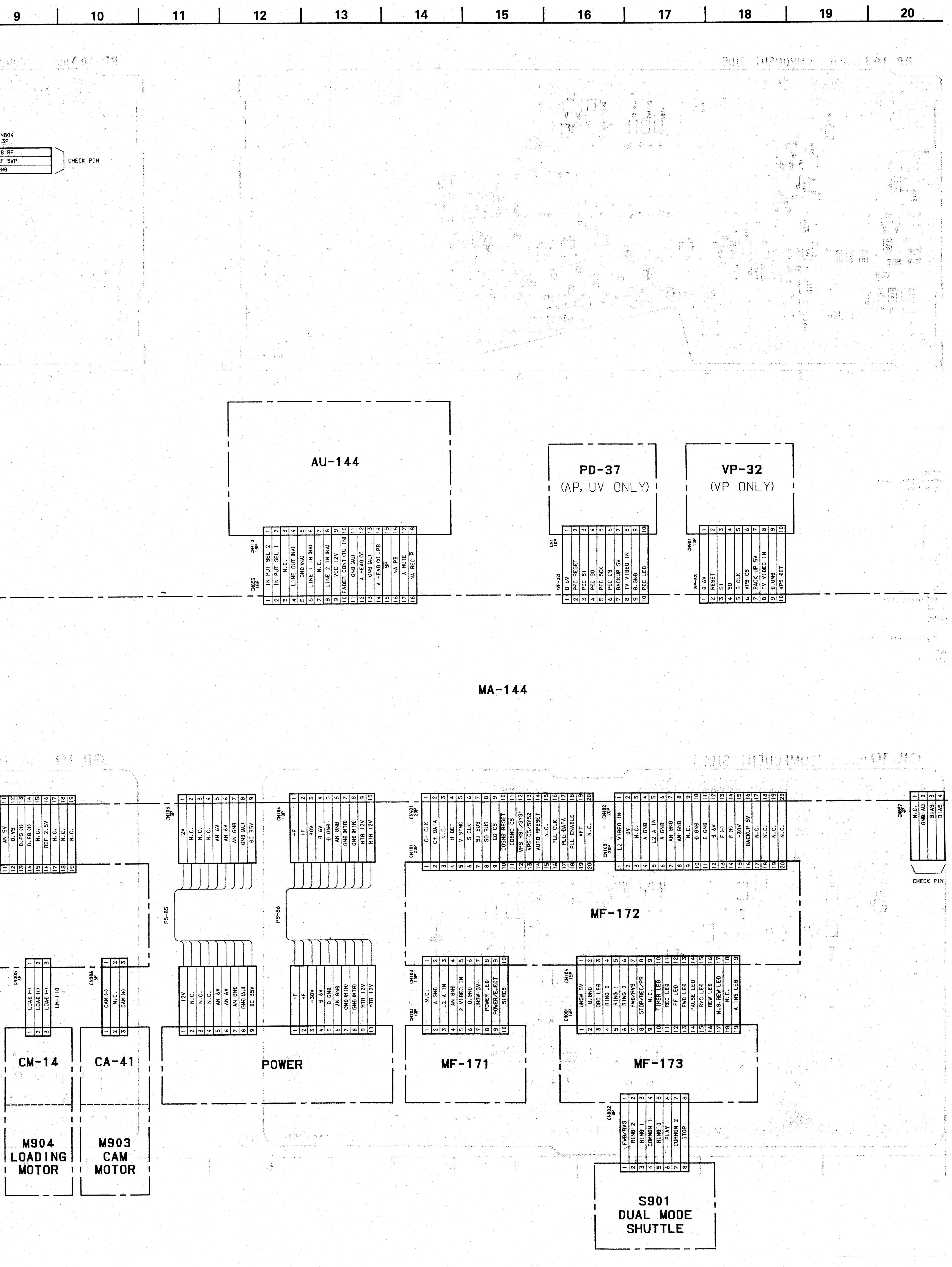

MA-144 BOARD
(See page 78,88)
CN202
CD 35V
D 12V
D 6V
AN 6V
AN 6V
DC -30V
CN201
MTR 12V
MTR 12V
D 6V
DC -30V
DC 4V
DC 0V
CN103
CN104
D101
D102
D204
IC501
C+ SELECTOR
B/CP
B
IC132
+12V REG
IC131
+9V REG
IC502
SECAM
IC605
VIDEO INPUT SELECT
IC601
Y/C PROCESS
RF701
RF MODU
IC603
PAL/SECAM DISCRI
IC503
SECAM DET
B/VP
IC203
SERVO SYSTEM CONTROL CPU
IC302
AFC
D301
IC204
REF2.5V GEN
IC301
CHARACTER GENE
IC101
DRUM PG/ CAP FG/ CTL REC/PB
IC202
DRUM/CAP INTEG
IC201
CAM/LOADING MOTOR DRIVE
TU801
UHF VHT TUNER
Q801
+30V REG
CN601
SW 5V
SW 9V
CN853
12V
CN201
MTR 12V
UNSW 5V
CN202
MTR 12V
SW 5V
CN402
D6V
-30V
BACK UP 5V
POWER CONT
HEATER (+)
HEATER (-)
05
GR-10 BOARD
(See page 76)
CN101
CN102
SYNCHRONIZED SERIAL BUS
IC103
RP-163 BOARD
(See page 73)
IC801
CN802
Q811
VIDEO REC/PB AMP
AU-144 BOARD
CN410
IC401
REC/PB AMP
INPUT SELECT
IC402
(See page 102)
MD-56 BOARD (See page 99)
CN004
CN009
T/S END SENS
DRUM FG/PG DET
IC001
T/S REEL FG
FG/PG SEP
IC003
WAVE SHAPER
IC002
CN007
CN002
MTR 12V
DRUM MOTOR
CAPSTAN MOTOR
CAPSTAN MOTOR DRIVE CAPSTAN FG AMP
IC1
MF-172 BOARD (See page 103)
CN102
D102
IC104
POWER FAIL DET
IC101
TIMER/ TUNER MODE CONT
IC102
EEP COM
D101
IC103
RESET PULSE GENE
FLUORESCENT DISPLAY
CN104
CN103
UNSW 5V
POWER LED
MF-173 BOARD
(See page 104)
CN001
LED
IC002
CN201
REMOTE CONTROL RECEIVER
D201, 202 POWER
LED DRIVE
MF-171 BOARD
(See page 105)
(See page 88)
D3
D 6V
BACK UP 5V
2 BOARD
(See page 89)
IC901
CN901
D901
VPS
VPS CONTROL
02
IC201
03, 211

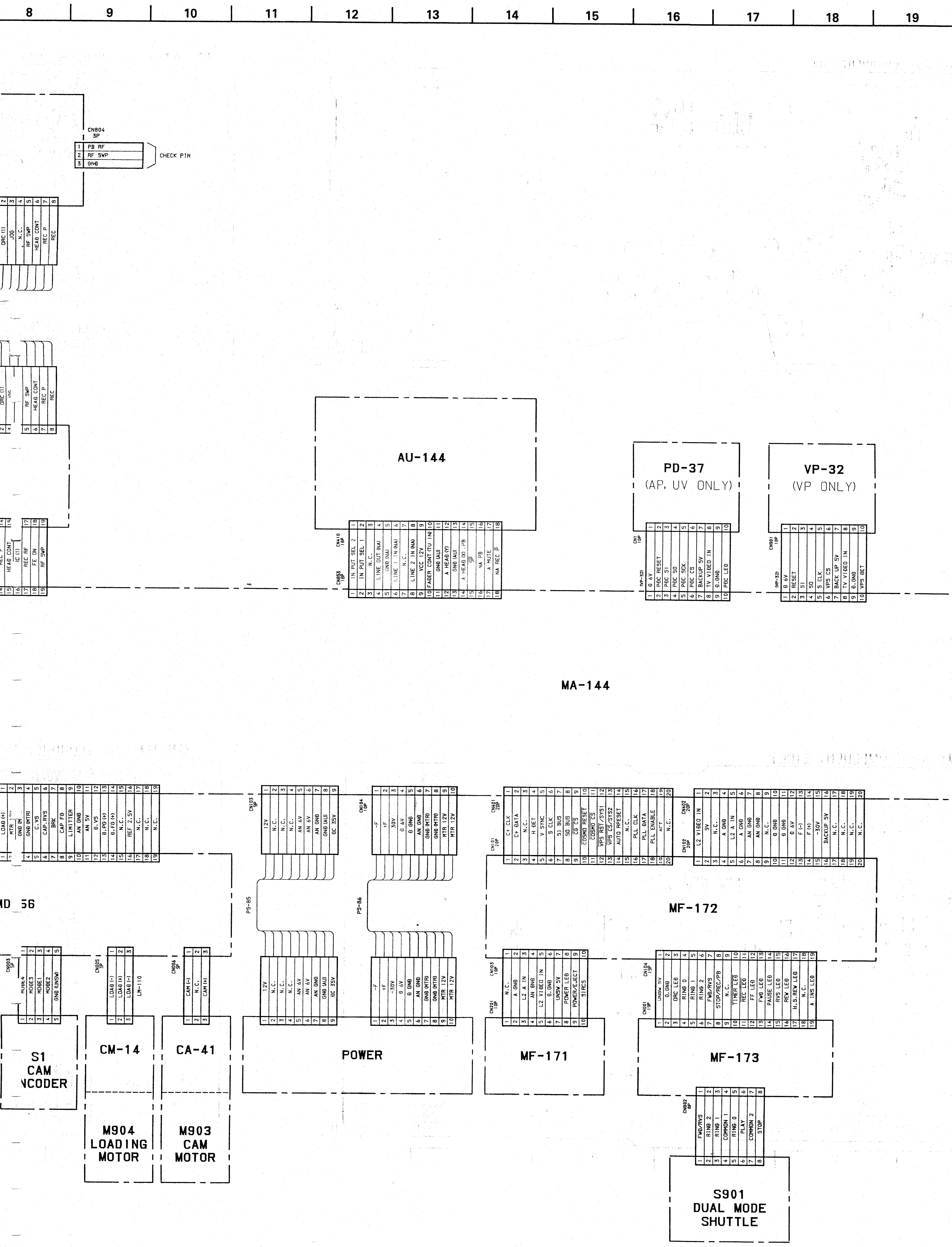
SECTION 4

PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
VIDEO
SP CH1
SP CH2
LP CH2
LP CH1
CN801
10P
SP 1
SP COM
SP 2
LP 2
LP COM
LP 1
GND
N.C.
N.C.
N.C.
RP-163
CN804
3P
PB RF
RF SWP
GND
CHECK PIN
CN802
11P
N.C.
SW 5V
REC RF
SW 9V
C.SYNC
C.ROT
SP
GND
PB C
GND
PB Y RF
CN803
8P
DRC (2)
DRC (1)
JOG
N.C.
RF SWP
HEAD CONT
REC P
REC
GR-52
GR-51
CN102
11P
CN103
8P
GR-10
CN101
19P
CN601
19P
REC
DRC (2)
SW 5V
GND
SP
JOG
SW 9V
NT/ PAL (S-DET)
PB C
COMP SYNC
GND
C ROT
PB Y RF
REC P
HEAD CONT
DRC (1)
REC RF
FE ON
RF SWP
FULL ERASE
FE-70
CN855
3P
FE HEAD
N.C.
GND AU
CTL
AC-172
CN101
3P
CTL (X)
AN GND
CTL (Y)
AUDIO REC/PB
AUDIO ERASE
CN854
4P
A HEAD (X)
A HEAD (Y)
GND (AU)
A ERASE HEAD
CN201
19P
CN004
19P
T.SENS
S.SENS
END LED
C-UP/DOWN
REC PRF
MODE4
MODE3
MODE2
MODE1
S.REEL
T.REEL
D 5V
MTR 12V
D GND
D GND
CAM (+)
CAM (+)
COM
COM
CN202
19P
CN007
19P
LOAD (+)
MTR 12V
GND (MTR)
GND (MTR)
C.VS
CAP.RVS
BRK
CAP FG
LIMITTER
AN GND
AN 5V
D.VS
D.PG (+)
D.FG (+)
N.C.
REF 2.5V
N.C.
N.C.
MD-56
CN001
10P
M2
VCC
HE (+)
H3
N.C.
GND (SW)
MTR 12V
N.C.
HE (-)
H1
MD-16
CN002
9P
CAP FG
SW 5V
BRK
CAP RVS
MTR 12V
C.VS
LIMITTER
GND (MTR)
GND (SW)
CN003
5P
MODE4
MODE3
MODE1
MODE2
GND (UNSW)
CN005
3P
LOAD (+)
LOAD (+)
LOAD (-)
LM-110
CN006
3P
CAM (-)
N.C.
CAM (+)
M901
DRUM MOTOR
M902
CAP MOTOR
S1.
CAM
ENCODER
CM-14
CA-41
M904
LOADING
MOTOR
M903
CAM
MOTOR
05


9
10
11
12
13
14
15
16
17
18
19
20
N804
3P
B RF
F SWP
NB
CHECK PIN
AU-144
PD-37
(AP, UV ONLY)
VP-32
(VP ONLY)
CN410
18P
CN853
18P
IN PUT SEL 2
IN PUT SEL 1
N.C.
LINE OUT (NA)
GND (NA)
LINE 1 IN (NA)
N.C.
LINE 2 IN (NA)
VCC 12V
FADER CONT (TU IN)
GND (AU)
A HEAD (Y)
GND (AU)
A HEAD (X) .PB
SP
NA PB
A MUTE
NA REC P
CN1
10P
(VP-32)
D 6V
PDC RESET
PDC SI
PDC SO
PDC SCK
PDC CS
BACKUP 5V
TV VIDEO IN
D.GND
PDC LED
CN901
10P
(VP-32)
D 6V
RESET
SI
SO
S CLK
VPS CS
BACK UP 5V
TV VIDEO IN
D.GND
VPS DET
MA-144
AN 5V
D.VS
D.PG (+)
D.FG (+)
N.C.
REF 2.5V
N.C.
N.C.
N.C.
CN103
9P
12V
N.C.
N.C.
N.C.
AN 6V
AN 6V
AN GND
GND (AU)
DC 35V
CN104
10P
-F
+F
30V
D 6V
D GND
AN GND
GND (MTR)
GND (MTR)
MTR 12V
MTR 12V
CN401
20P
CN101
20P
C+ CLK
C+ DATA
N.C.
H DET
V SYNC
S CLK
SI BUS
SO BUS
CG CS
COSMO RESET
COSMO CS
VPS RST/SYS1
VPS CS/SYS2
AUTO RPESET
N.C.
PLL CLK
PLL DATA
PLL ENABLE
AFT
N.C.
CN402
20P
CN102
20P
L2 VIDEO IN
9V
N.C.
A GND
L2 A IN
A GND
AN GND
AN GND
N.C.
D GND
D GND
D 6V
F (-)
F (+)
-30V
BACKUP 5V
N.C.
N.C.
N.C.
N.C.
CN857
4P
N.C.
GND AU
BIAS
BIAS
CHECK PIN
PS-85
PS-86
MF-172
CN005
3P
LOAD (-)
LOAD (+)
LOAD (-)
LM-110
CN006
3P
CAM (-)
N.C.
CAM (+)
12V
N.C.
N.C.
N.C.
AN 6V
AN 6V
AN GND
GND (AU)
DC 35V
-F
+F
-30V
D 6V
D GND
AN GND
GND (MTR)
GND (MTR)
MTR 12V
MTR 12V
CN103
10P
CN201
10P
N.C.
A GND
L2 A IN
AN GND
L2 VIDEO IN
D.GND
UNSW 5V
POWER LED
POWER/EJECT
SIRCS
CN104
19P
CN001
19P
UNSW 5V
D.GND
ORC LED
RING 0
RING 1
RING 2
FWD/RVS
STOP/REC/PB
N.C.
TIMER LED
REC LED
FF LED
FWD LED
PAUSE LED
RVS LED
REW LED
H.S.REW LED
N.C.
A INS LED
CM-14
CA-41
POWER
MF-171
MF-173
CN002
8P
FWD/RVS
RING 2
RING 1
COMMON 1
RING 0
PLAY
COMMON 2
STOP
M904
LOADING
MOTOR
M903
CAM
MOTOR
S901
DUAL MODE
SHUTTLE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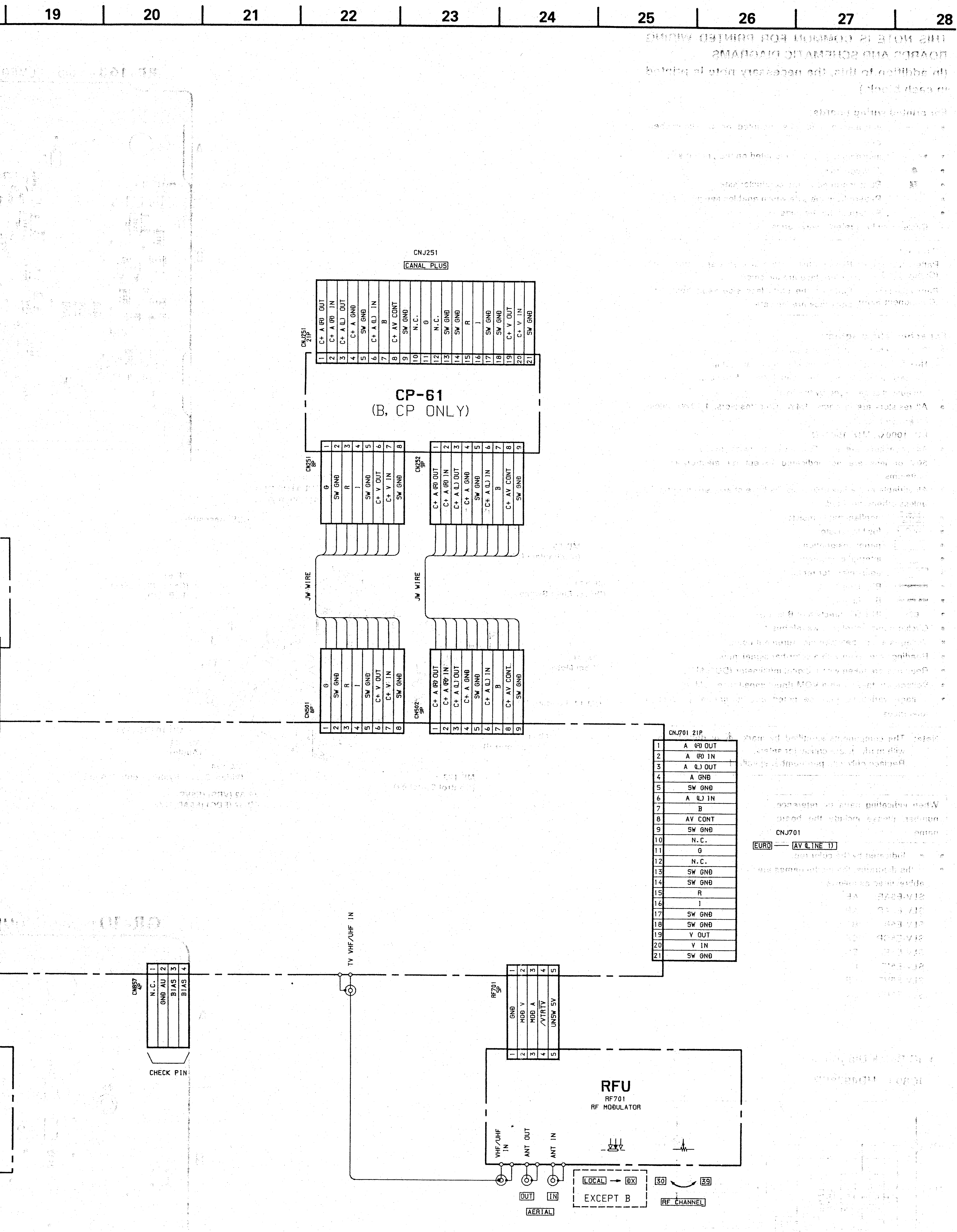
9
10
11
12
13
14
15
16
17
18
19
CN804 3P
PB RF
RF SWP
GND
CHECK PIN
AU-144
CN410 18P
CN953 18P
IN PUT SEL 2
IN PUT SEL 1
N.C.
LINE OUT (NA)
GND (NA)
LINE 1 IN (NA)
LINE 2 IN (NA)
VCC 12V
FADER CONT (TU IN)
GND (AU)
A HEAD (Y)
A HEAD (X) ,PB
NA PB
A MUTE
NA REC P
PD-37
(AP, UV ONLY)
CN1 10P
D 6V
PDC RESET
PDC SI
PDC SO
PDC SCK
PDC CS
BACKUP 5V
TV VIDEO IN
D.GND
PDC LED
VP-32
(VP ONLY)
CN901 10P
RESET
SI
SO
S CLK
VPS CS
BACK UP 5V
VPS DET
MA-144
CN103 9P
12V
AN 6V
AN GND
GND (AU)
DC 35V
CN104 10P
-F
+F
30V
D 6V
D GND
GND (MTR)
MTR 12V
PS-85
PS-86
CN401 20P
CN101 20P
C+ CLK
C+ DATA
H DET
V SYNC
S CLK
SI BUS
SO BUS
CG CS
COSMO RESET
COSMO CS
VPS RST/SYS1
VPS CS/SYS2
AUTO RPESET
PLL CLK
PLL DATA
PLL ENABLE
AFT
CN402 20P
CN102 20P
L2 VIDEO IN
9V
A GND
L2 A IN
-30V
F (-)
F (+)
BACKUP 5V
MF-172
CN103 10P
CN201 10P
L2 VIDEO IN
UNSW 5V
POWER LED
POWER/EJECT
SIRCS
MF-171
CN104 19P
CN001 19P
UNSW 5V
D.GND
DRC LED
RING 0
RING 1
RING 2
FWD/RVS
STOP/REC/PB
TIMER LED
REC LED
FF LED
FWD LED
PAUSE LED
RVS LED
REW LED
H.S.REW LED
A INS LED
MF-173
CN002 8P
COMMON 1
PLAY
COMMON 2
STOP
S901
DUAL MODE
SHUTTLE
POWER
CN905 3P
LOAD (-)
LOAD (+)
LM-110
CM-14
M904
LOADING
MOTOR
CN906 3P
CAM (-)
CAM (+)
CA-41
M903
CAM
MOTOR
CN903 5P
MODE3
MODE1
MODE2
GND (UNSW)
S1
CAM
NCODER
ND 56
LOAD (+)
MTR ON
GND (MTR)
C.VS
CAP.RVS
BRK
CAP FG
LIMITTER
AN GND
AN 5V
D.VS
D.PG (+)
D.FG (+)
REF 2.5V
DRC (1)
JOG
RF SWP
HEAD CONT
REC P
REC
REC RF
FE ON


19
20
21
22
23
24
25
26
27
28
CNJ251
CANAL PLUS
CNJ251 21P
1 C+ A (R) OUT
2 C+ A (R) IN
3 C+ A (L) OUT
4 C+ A GND
5 SW GND
6 C+ A (L) IN
7 B
8 C+ AV CONT
9 SW GND
10 N.C.
11 G
12 N.C.
13 SW GND
14 SW GND
15 R
16 I
17 SW GND
18 SW GND
19 C+ V OUT
20 C+ V IN
21 SW GND
CP-61
(B, CP ONLY)
CN251 8P
G
SW GND
R
I
SW GND
C+ V OUT
C+ V IN
SW GND
CN252 9P
C+ A (R) OUT
C+ A (R) IN
C+ A (L) OUT
C+ A GND
SW GND
C+ A (L) IN
B
C+ AV CONT
SW GND
JW WIRE
JW WIRE
CN501 8P
CN502 9P
CNJ701 21P
1 A (R) OUT
2 A (R) IN
3 A (L) OUT
4 A GND
5 SW GND
6 A (L) IN
7 B
8 AV CONT
9 SW GND
10 N.C.
11 G
12 N.C.
13 SW GND
14 SW GND
15 R
16 I
17 SW GND
18 SW GND
19 V OUT
20 V IN
21 SW GND
CNJ701
EURO
AV (LINE 1)
CN857 4P
1 N.C.
2 GND AU
3 BIAS
4 BIAS
CHECK PIN
TV VHF/UHF IN
RF701 5P
1 GND
2 MOD V
3 MOD A
4 /VTRTV
5 UNSW 5V
RFU
RF701
RF MODULATOR
VHF/UHF IN
ANT OUT
ANT IN
OUT
IN
AERIAL
LOCAL → 0X
EXCEPT B
30
39
RF CHANNEL

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For printed wiring boards:
- ○——— : indicates a lead wire mounted on the component side.
- ●——— : indicates a lead wire mounted on the printed side.
- ● : Through hole.
- ■ : Parts mounted on the conductor side.
- ░ : Pattern from the side which enables seeing.
- ▒ : Pattern of the rear side.
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

For schematic diagram:
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W (Chip resistors: 1/10W) unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF: μμF
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- ☐ : panel designation.
- △ : internal component.
- ☐ : adjustment for repair.*
- ━━━ : B + Line.*
- ━ ━ ━ : B − Line.*
- ⇨ : IN/OUT direction of B line (+, −).
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage are taken with a VOM (Input impedance 10MΩ).
- Voltage variations may be noted due to normal production tolerances.

> **Note:** The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
> Replace only with part number specified.

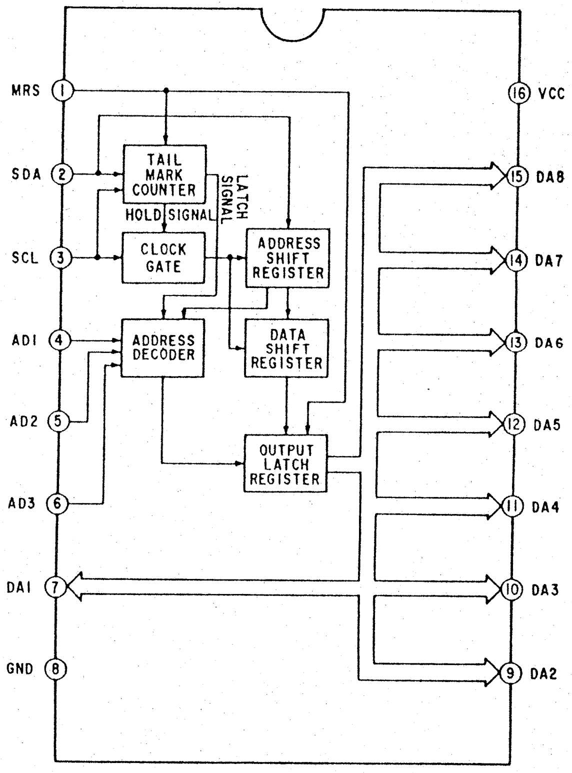
> When indicating parts by reference number, please include the board name.

- * : Indicated by the color red.
- In the diagrams, the model names are abbreviated as follows.

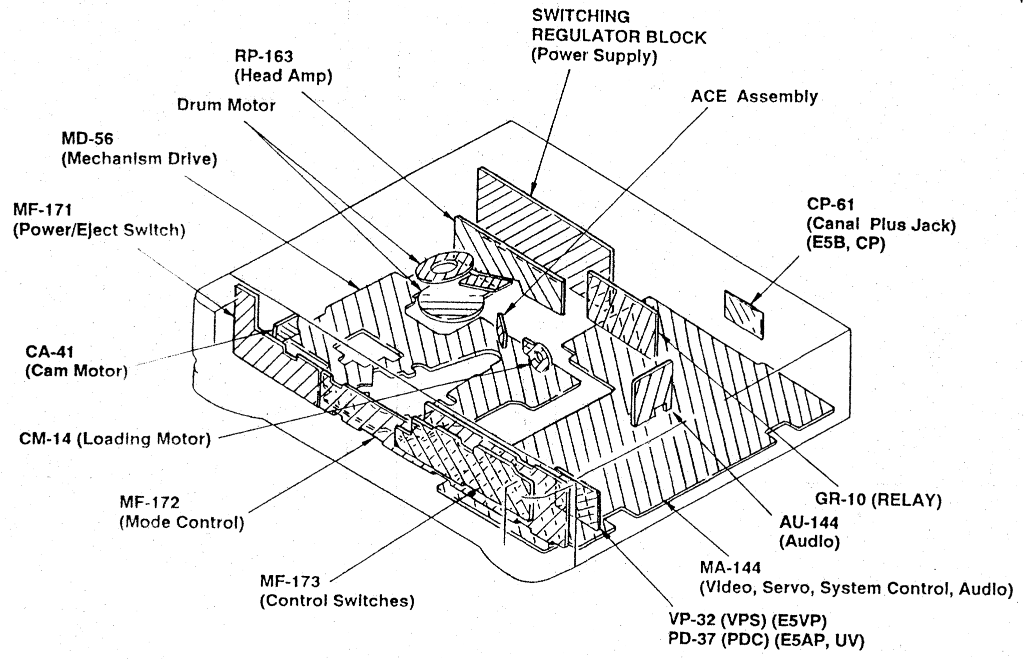
SLV-E5AE	: AE
SLV-E5AP	: AP
SLV-E5B	: B
SLV-E5CP	: CP
SLV-E5EI	: EI
SLV-E5IT	: IT
SLV-E5VP	: VP
SLV-E6UV	: UV

- **IC Block Diagrams**

IC803 HD4978FP



MRS 1
SDA 2
SCL 3
AD1 4
AD2 5
AD3 6
DA1 7
GND 8
16 VCC
15 DA8
14 DA7
13 DA6
12 DA5
11 DA4
10 DA3
9 DA2
TAIL MARK COUNTER
HOLD SIGNAL
LATCH SIGNAL
CLOCK GATE
ADDRESS SHIFT REGISTER
ADDRESS DECODER
DATA SHIFT REGISTER
OUTPUT LATCH REGISTER

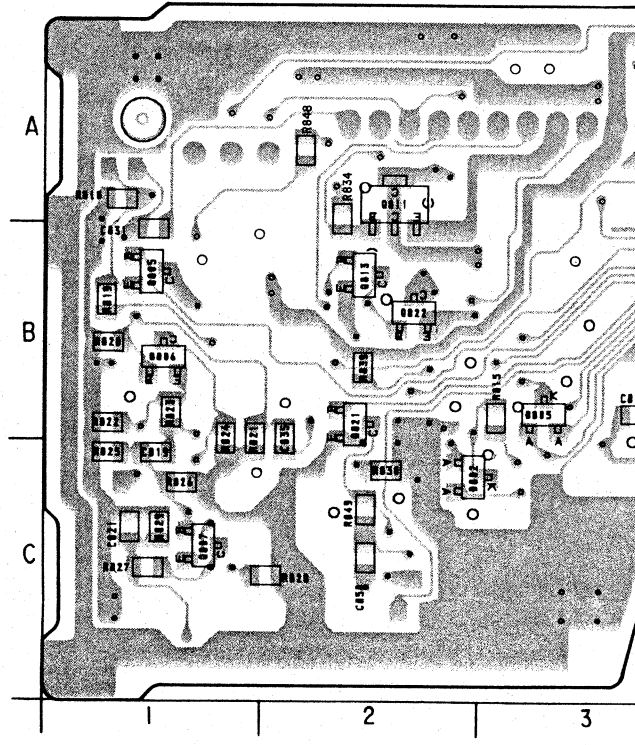


SWITCHING REGULATOR BLOCK (Power Supply)
RP-163 (Head Amp)
Drum Motor
ACE Assembly
MD-56 (Mechanism Drive)
MF-171 (Power/Eject Switch)
CP-61 (Canal Plus Jack) (E5B, CP)
CA-41 (Cam Motor)
CM-14 (Loading Motor)
MF-172 (Mode Control)
GR-10 (RELAY)
AU-144 (Audio)
MA-144 (Video, Servo, System Control, Audio)
MF-173 (Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)

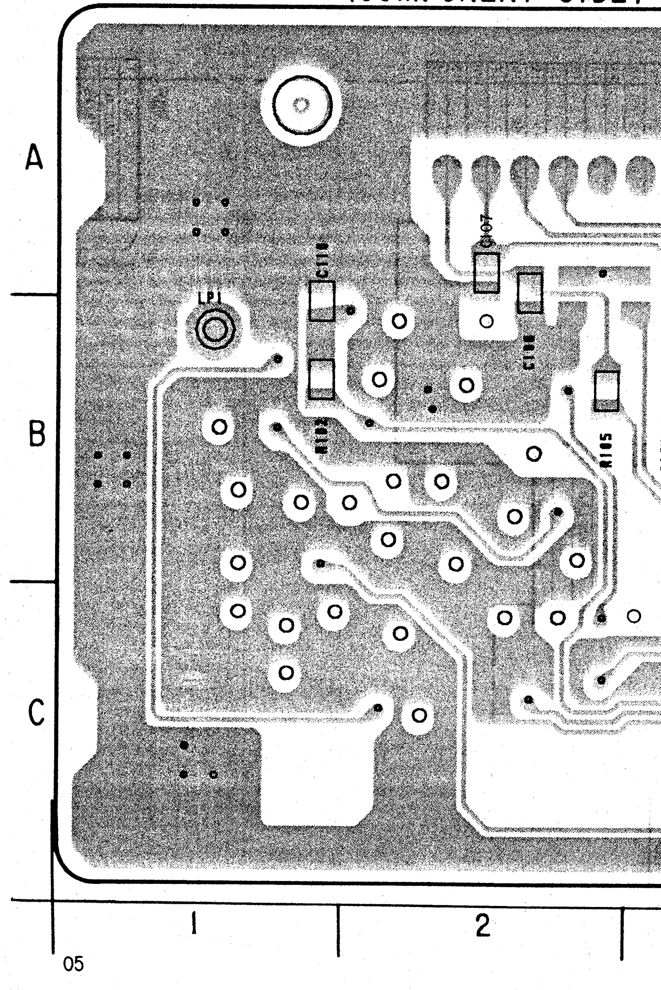
RP-163 (HEAD AMP), GR-10 (RELAY) PRINTED WI

– Ref. No.: RP-163, GR-10 Boards; 1,000 series –

RP-163 BOARD (COMPONENT SIDE)

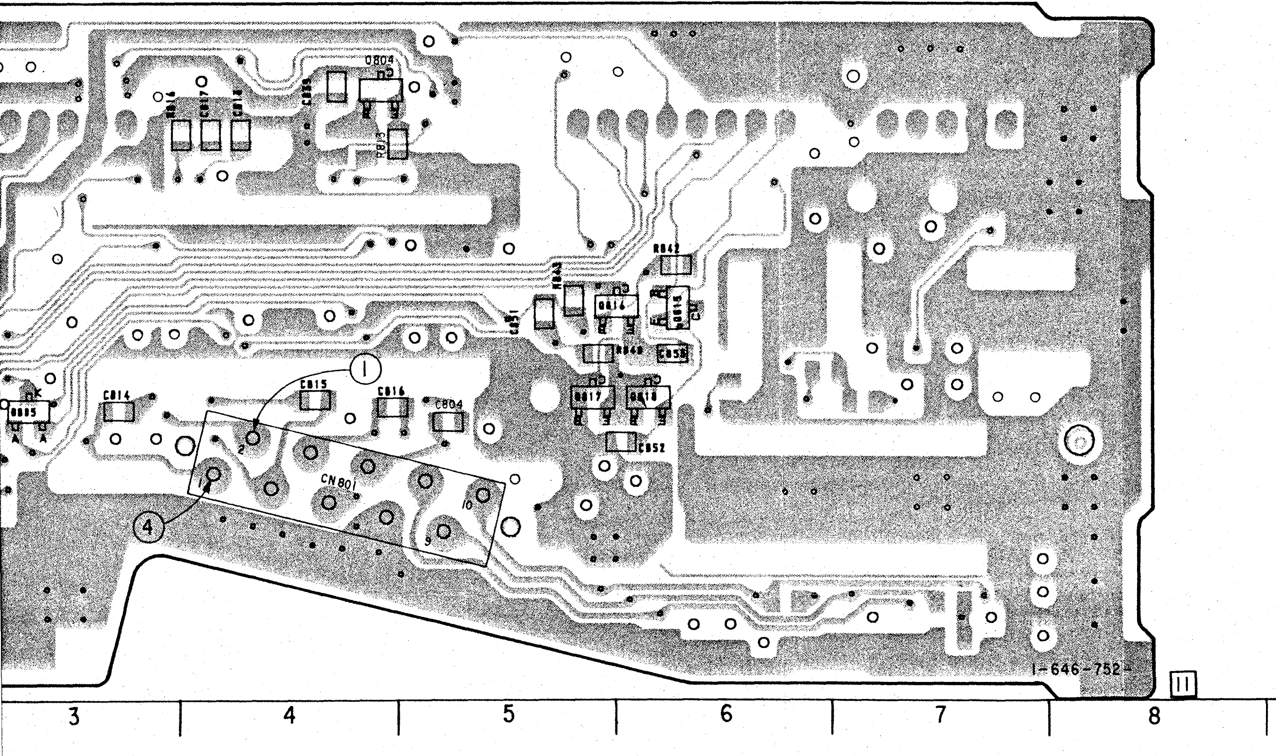


GR-10 BOARD (COMPONENT SIDE)

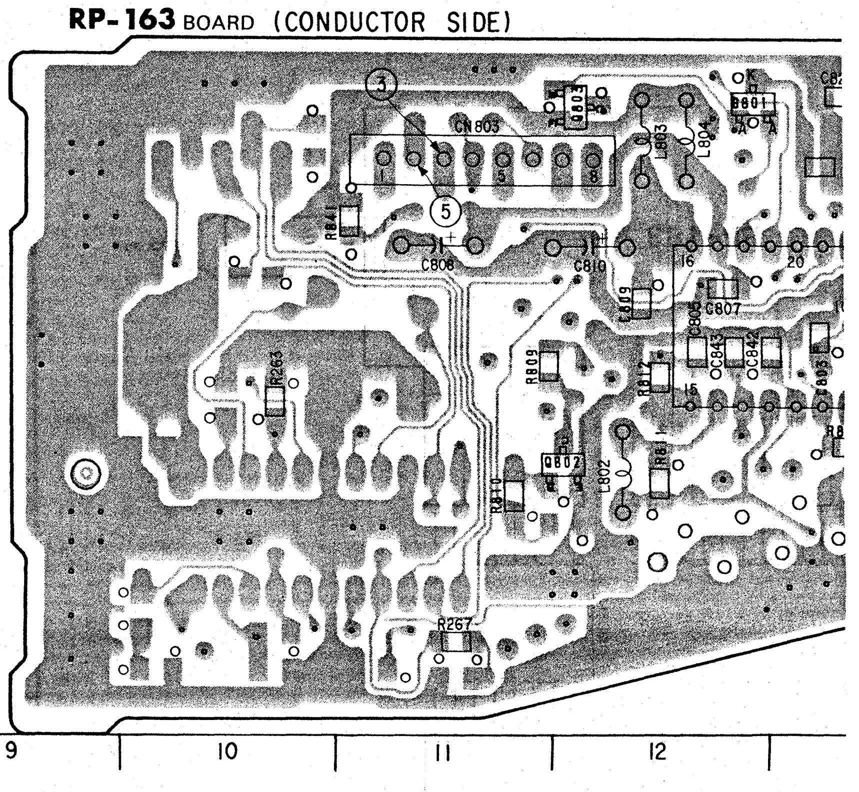


A
B
C
1
2
LP1
05

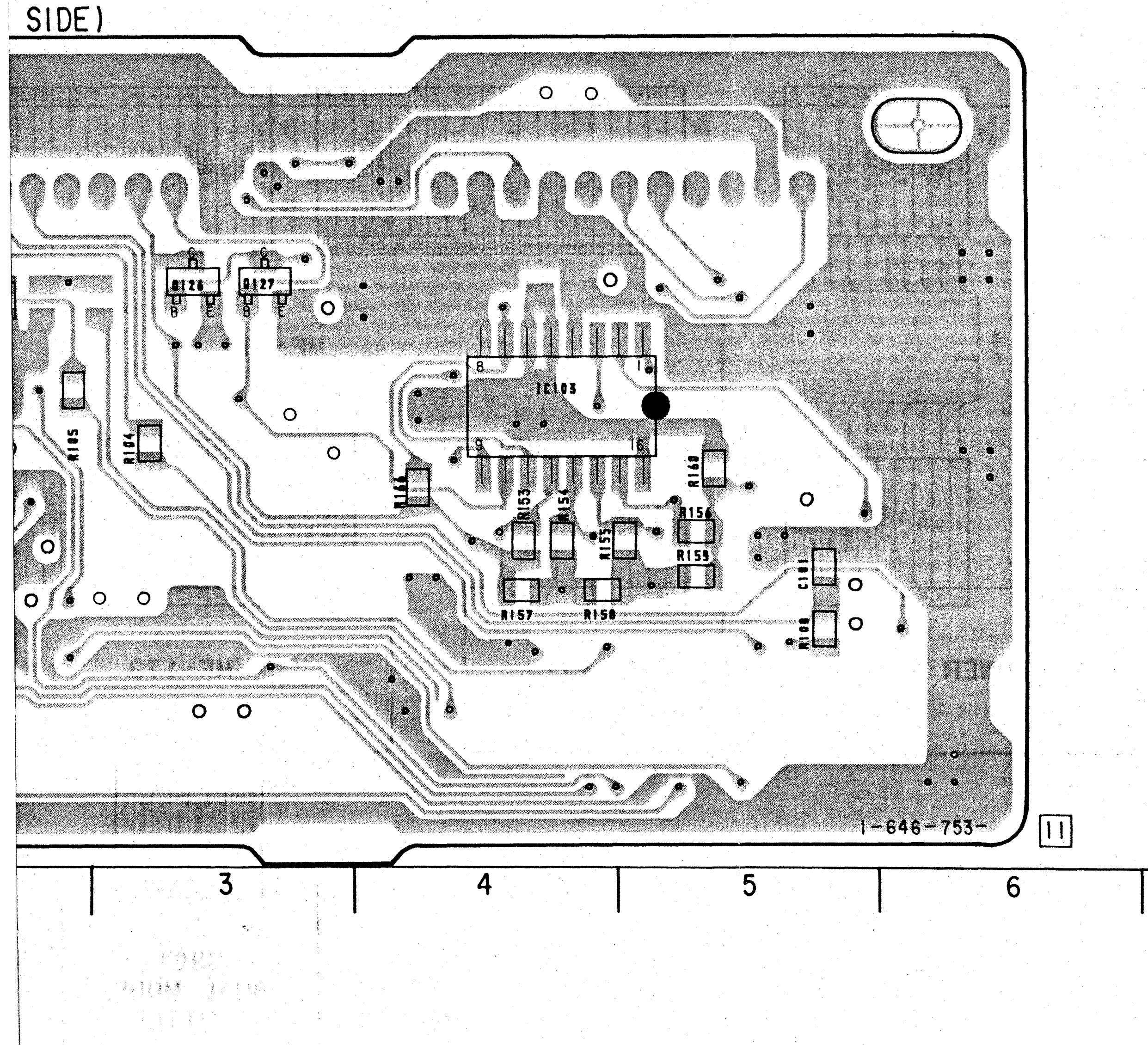
IDE)


Q804
R813
R814
C817
R818
C839
R842
R843
C851
Q814
Q815
R840
C850
Q817
Q818
C852
Q805
C814
C815
C816
C804
CN801
①
④
2
9
10
1-646-752-
11
3
4
5
6
7
8

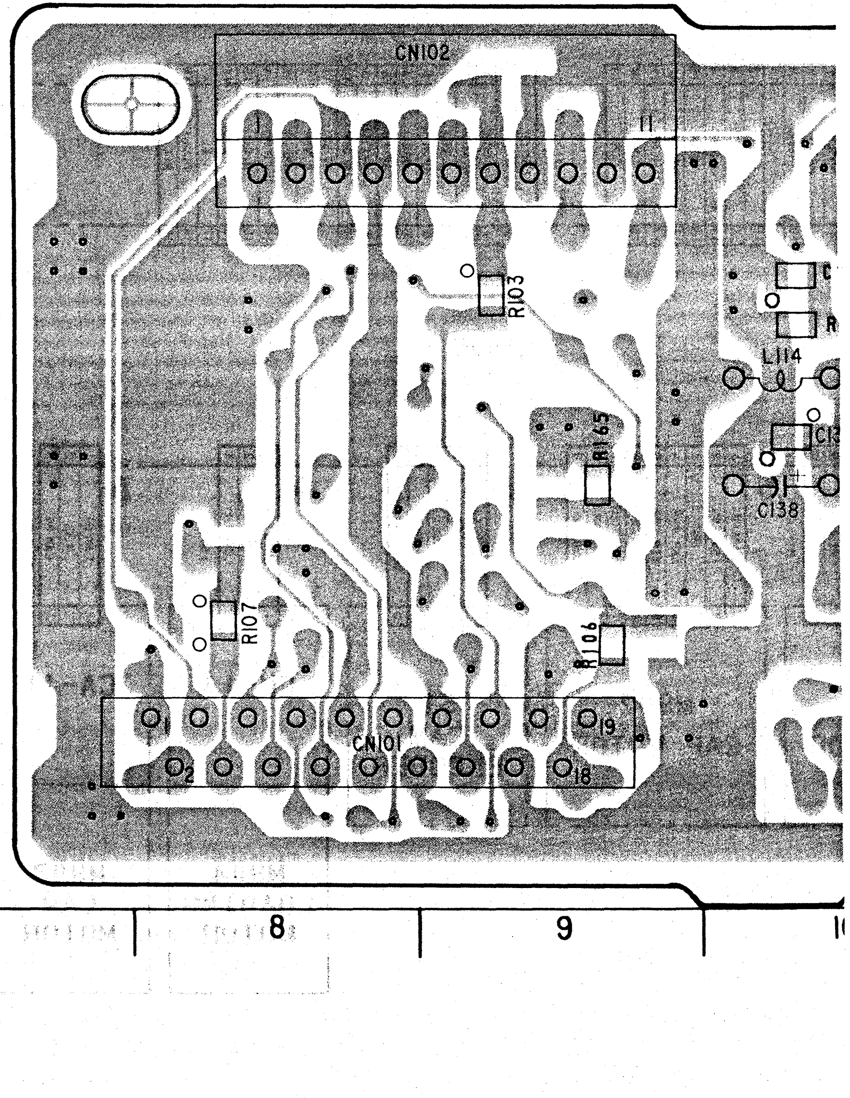
RP-163 BOARD (CONDUCTOR SIDE)


③
⑤
CN805
Q803
D801
L803
L804
R841
C808
C810
C809
C805
C807
C843
C842
R263
R809
R812
Q802
L802
R810
R267
15
16
20
9
10
11
12

SIDE)


Q126
Q127
B
E
IC103
8
1
9
16
R105
R104
R166
R153
R154
R155
R156
R159
R160
R157
R158
C161
R168
1-646-753-
11
3
4
5
6

GR-10 BOARD (CONDUCTOR SIDE)

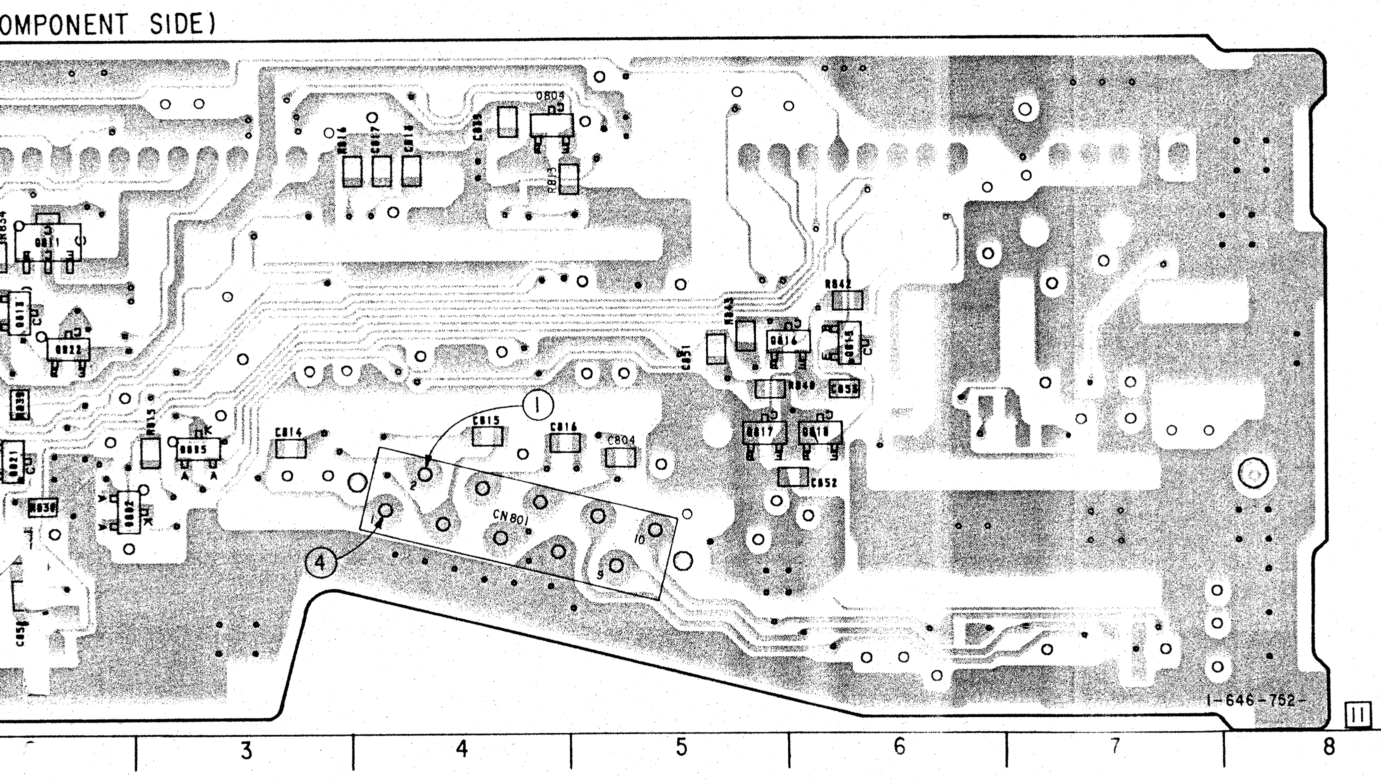

CN102
11
R103
L114
R165
C138
R107
R106
CN101
1
2
19
18
7
8
9

HEAD AM

(RELAY) PRINTED WIRING BOARDS

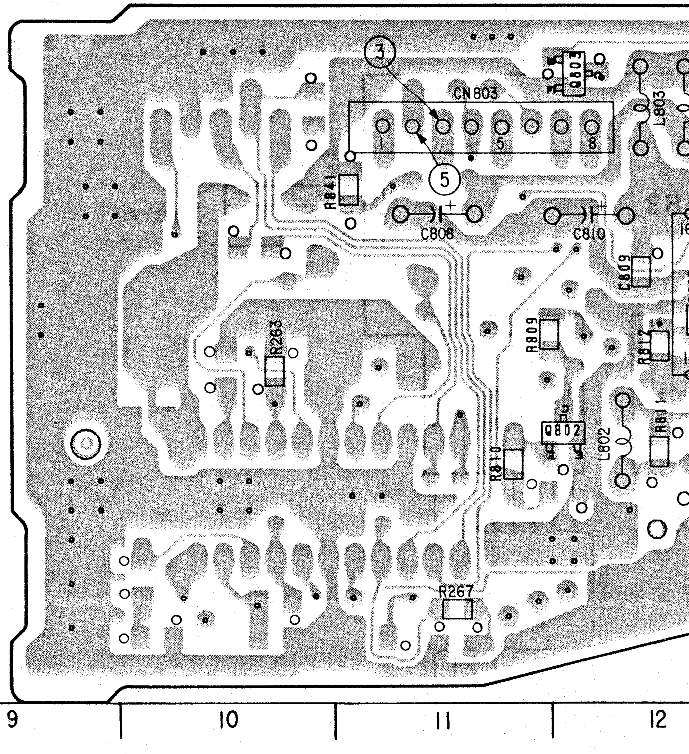
ls; 1,000 series –

OMPONENT SIDE)



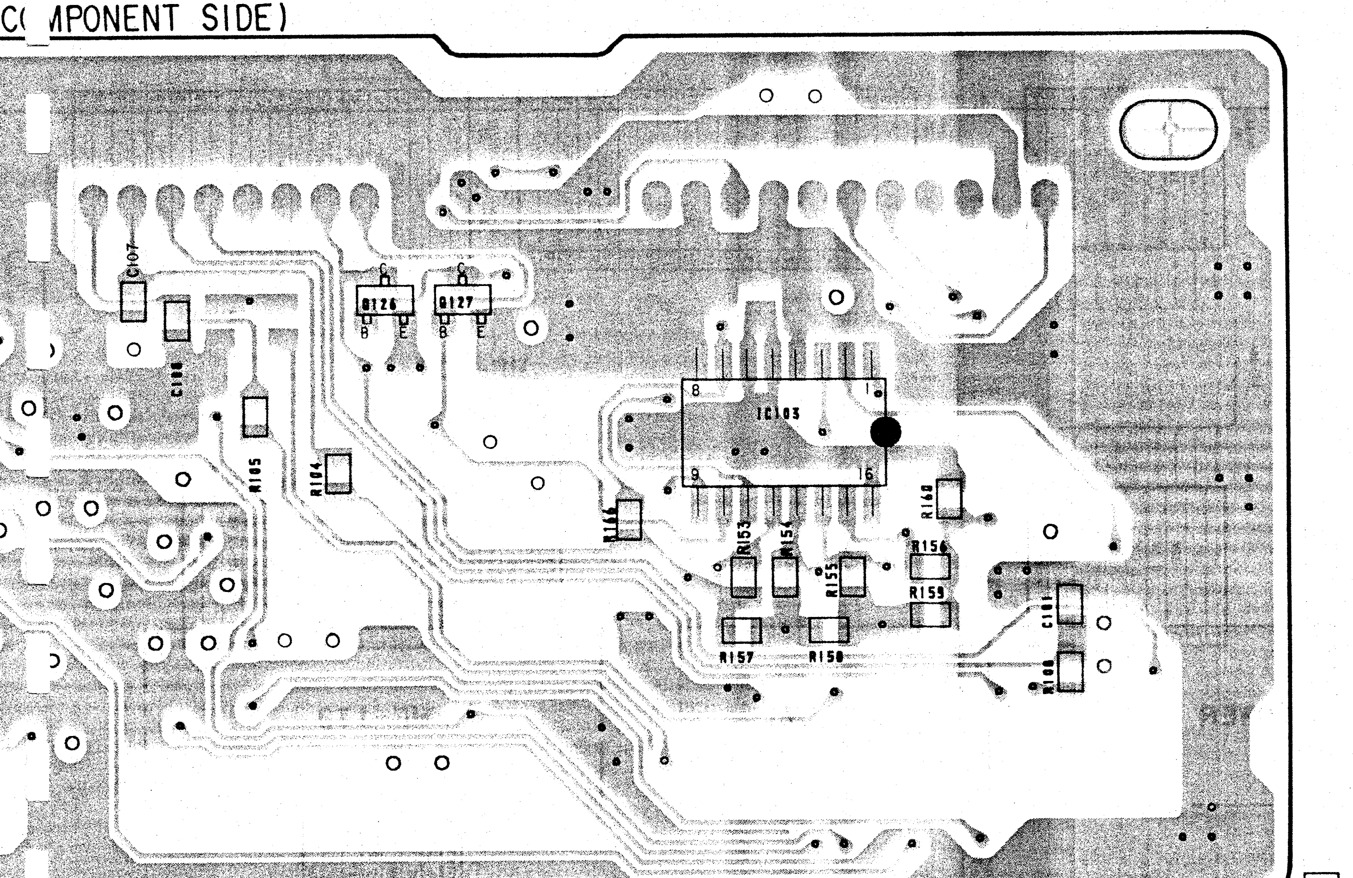
Q804
R814
C807
C818
C809
R815
Q811
Q812
Q805
Q802
R813
C814
C815
C816
C804
CN801
①
④
2
9
10
R842
R843
Q816
C851
Q817
Q818
C852
C850
1-646-752-
11
3
4
5
6
7
8

RP-163 BOARD (CONDUCTOR SIDE)



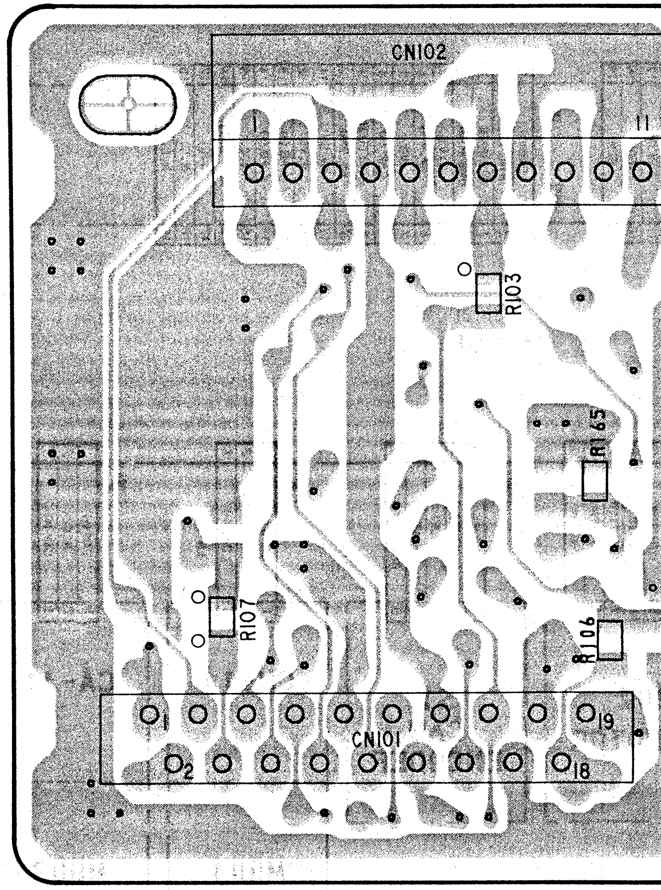
③
⑤
CN803
Q803
L803
5
8
R841
C808
C810
C809
R263
R809
R810
Q802
L802
R267
9
10
11
12

C(MPONENT SIDE)



C107
C106
Q126
Q127
IC103
8
1
9
16
R104
R105
R161
R153
R154
R151
R155
R160
R156
R159
R157
R158
C101
R108
1-646-753-
11
2
3
4
5
6
7

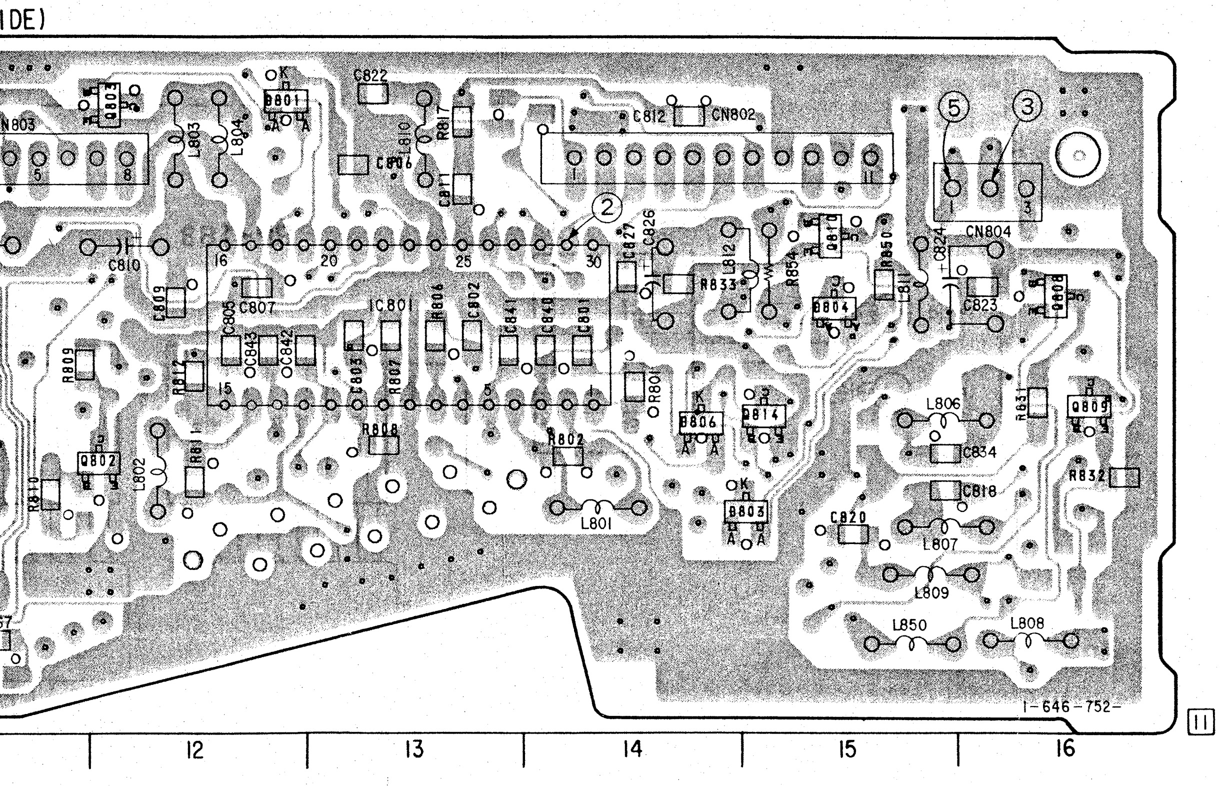
GR-10 BOARD (CONDUCTOR SIDE)



CN102
1
11
R103
R165
R107
R106
CN101
1
2
19
18
8
9

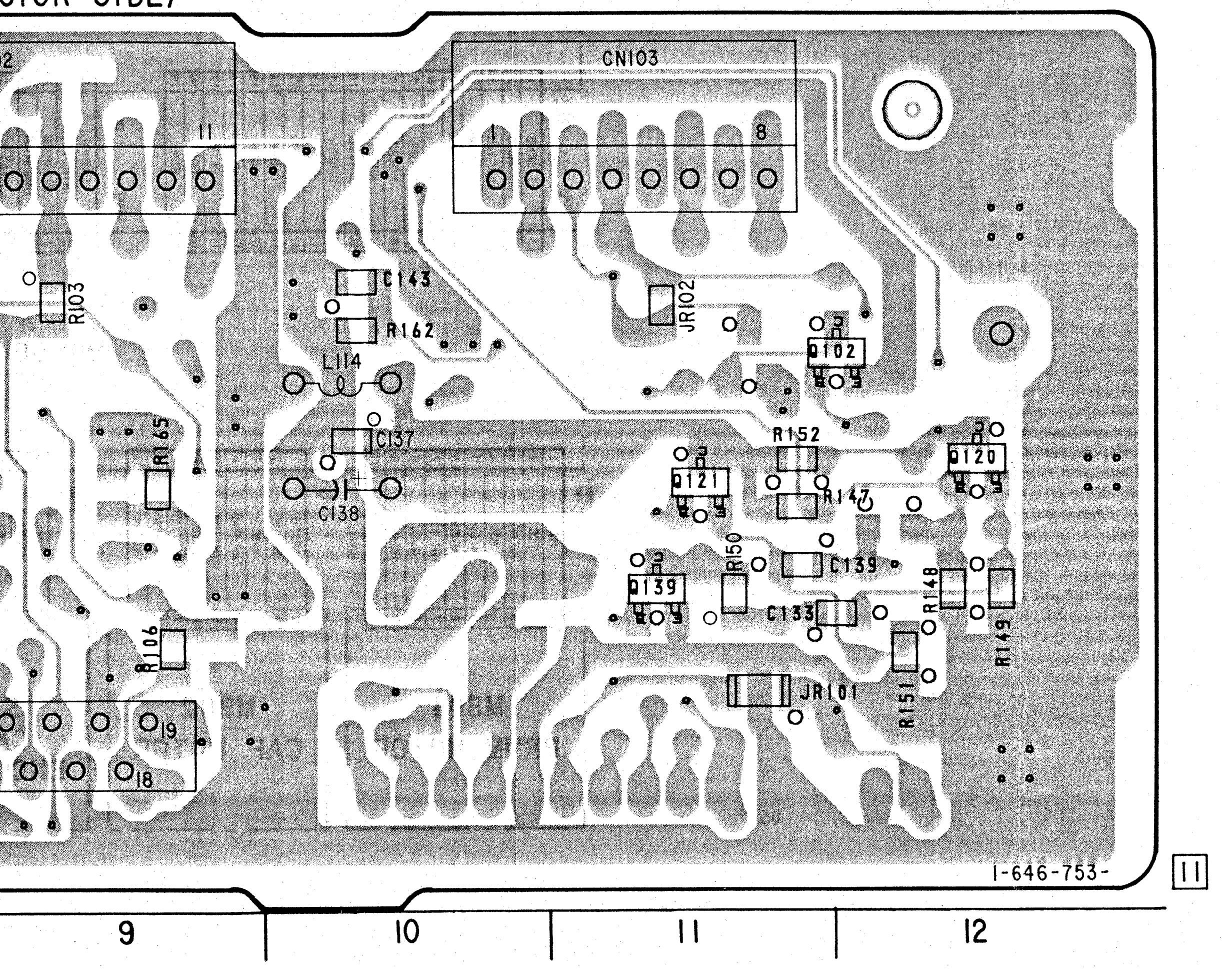
HE

IDE)


CN803
CN802
CN804
C822
C812
C806
C810
C809
C807
C805
C843
C842
C803
C802
C841
C840
C801
C827
C826
C824
C823
C834
C818
C820
IC801
D801
D806
D803
D804
Q803
Q802
Q813
Q808
Q809
Q814
R817
R809
R812
R811
R810
R808
R807
R806
R802
R801
R833
R854
R850
R831
R832
L803
L804
L810
L802
L801
L812
L811
L806
L807
L809
L850
L808
②
⑤
③
1-646-752-
11
12
13
14
15
16

RP-163 BOARD	
CN801	C-4
CN802	A-14
CN803	A-11
CN804	A-16
D801	A-12
D802	C-2
D803	C-15
D804	B-15
D805	B-3
D806	B-14
IC260	C-10
IC803	B-13
Q802	B-12
Q803	A-12
Q804	A-4
Q805	B-1
Q806	B-1
Q807	C-1
Q808	B-16
Q809	B-16
Q810	A-15
Q811	A-2
Q813	B-2
Q814	B-15
Q815	B-6
Q816	B-6
Q817	B-5
Q818	B-6
Q821	B-2
Q822	B-2

CTOR SIDE)

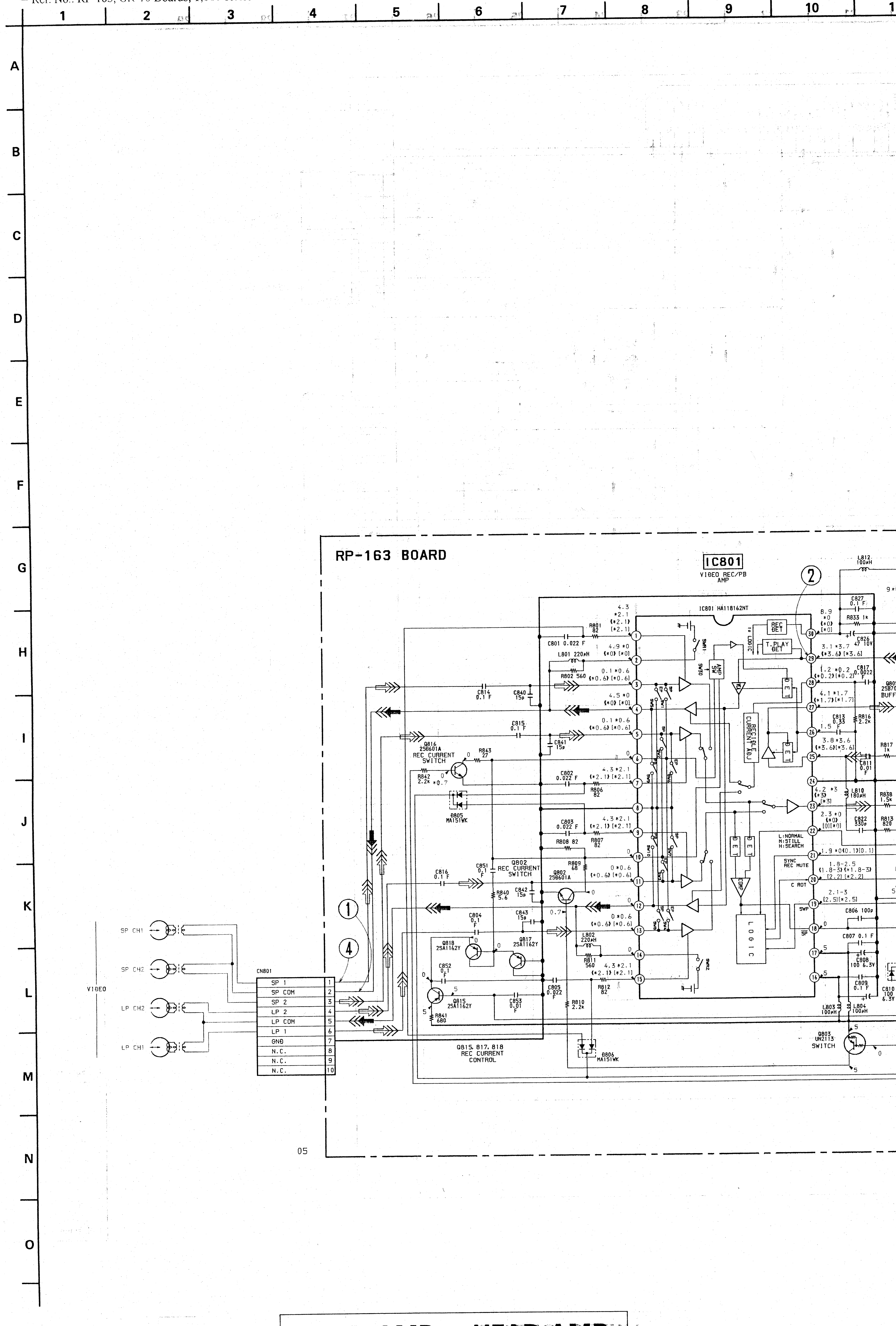

CN103
1
8
11
C143
R162
R103
JR102
Q102
L114
C137
C138
R165
R152
Q120
Q121
R147
R150
C139
Q139
C133
R148
R149
R106
JR101
R151
19
18
1-646-753-
11
9
10
11
12

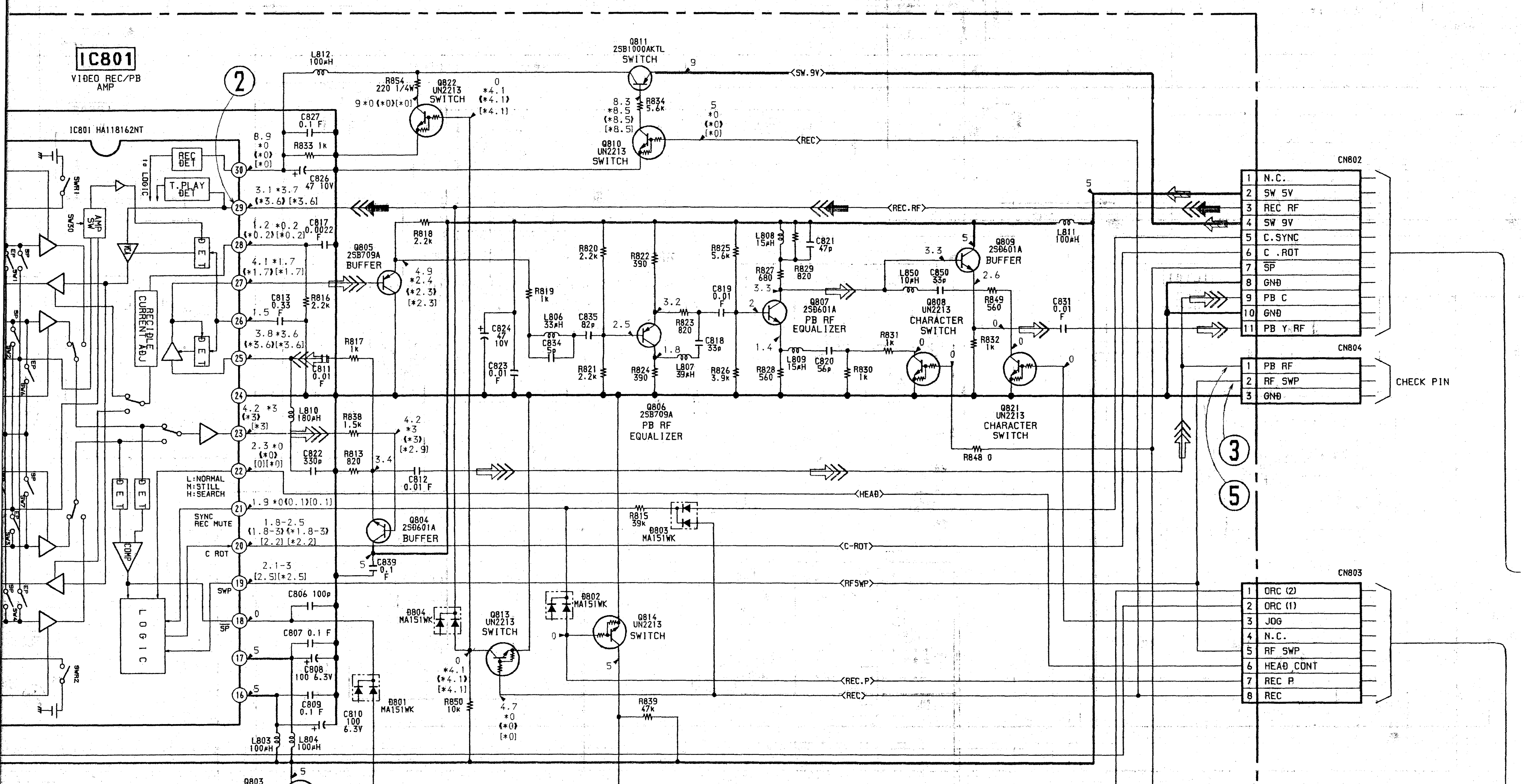
GR-10 BOARD	
CN101	C-8
CN102	A-8
CN103	A-11
IC103	B-4
Q102	B-11
Q120	B-12
Q121	B-11
Q126	A-3
Q127	A-3
Q139	B-11

HEAD AMP HEAD AMP

RP-163 (HEAD AMP), GR-10 (RELAY) SCHEMATIC DIAGRAM

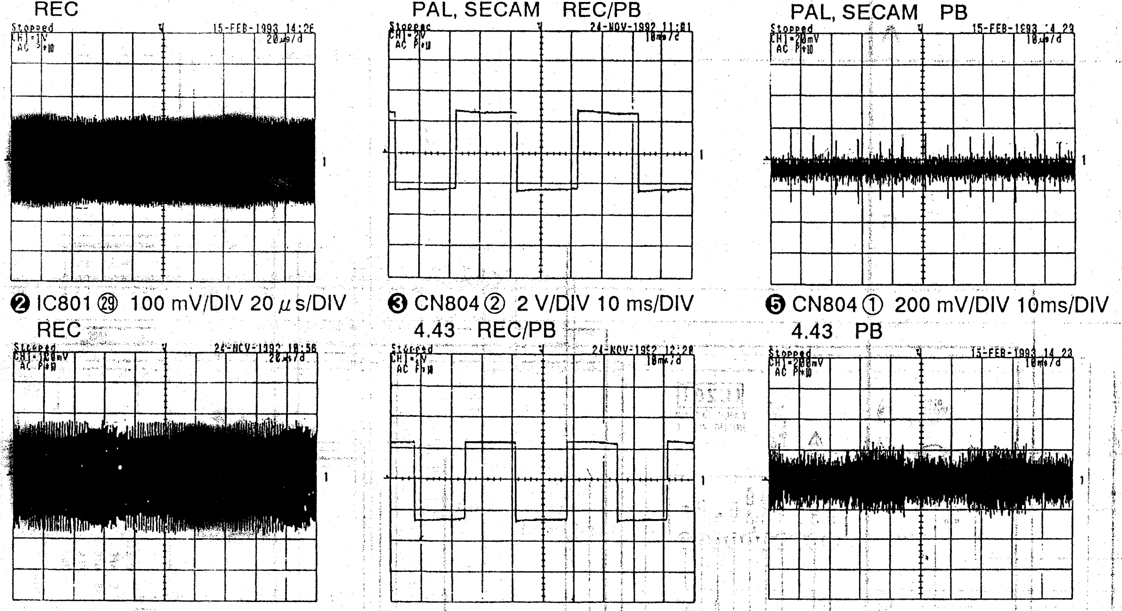
– Ref. No.: RP-163, GR-10 Boards; 1,000 series –


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
RP-163 BOARD
IC801
VIDEO REC/PB AMP
IC801 HA118162NT
REC DET
T.PLAY DET
LOGIC
AMP SW
REC/PB CURRENT ADJ
COMP
VIDEO
SP CH1
SP CH2
LP CH2
LP CH1
CN801
SP 1
SP COM
SP 2
LP 2
LP COM
LP 1
GND
N.C.
Q816 2SB601A REC CURRENT SWITCH
Q802 2SB601A REC CURRENT SWITCH
Q805 MA151WK
Q806 MA151WK
Q818 2SA1162Y
Q817 2SA1162Y
Q815 2SA1162Y
Q815, 817, 818 REC CURRENT CONTROL
Q803 UN2113 SWITCH
L:NORMAL
M:STILL
H:SEARCH
SYNC REC MUTE
C ROT
SWP
L812 100µH
L801 220µH
L802 220µH
L810 180µH
L803 100µH
L804 100µH
C801 0.022 F
C814 0.1 F
C840 15p
C815 0.1 F
C841 15p
C802 0.022 F
C803 0.022 F
C816 0.1 F
C851 0.1 F
C842 15p
C804 0.1 F
C843 15p
C852 0.1 F
C853 0.01 F
C805 0.022 F
C827 0.1 F
C826 47 10V
C817 0.0022 F
C813 0.33
C811 0.01 F
C822 330p
C806 100p
C807 0.1 F
C808 100 6.3V
C809 0.1 F
C810 100 6.3V
R801 82
R802 560
R806 82
R807 82
R808 82
R809 68
R810 2.2k
R811 560
R812 82
R840 5.6
R841 680
R842 2.2k
R843 27
R833 1k
R816 2.2k
R817 1k
R838 1.5k
R813 820
①
②
④
05


IC801
VIDEO REC/PB AMP
IC801 HA118162NT
REC DET
T.PLAY DET
AMP SW
REC/PLE CURRENT ADJ.
LOGIC
L:NORMAL
M:STILL
H:SEARCH
SYNC REC MUTE
C ROT
SWP
SP
Q811 2SB1000AKTL SWITCH
Q822 UN2213 SWITCH
Q810 UN2213 SWITCH
Q805 2SB709A BUFFER
Q806 2SB709A PB RF EQUALIZER
Q807 2SD601A PB RF EQUALIZER
Q808 UN2213 CHARACTER SWITCH
Q809 2SD601A BUFFER
Q821 UN2213 CHARACTER SWITCH
Q804 2SD601A BUFFER
Q813 UN2213 SWITCH
Q814 UN2213 SWITCH
Q803 UN2113 SWITCH
D804 MA151WK
D802 MA151WK
D803 MA151WK
D801 MA151WK
SW.9V
REC
REC.RF
HEAD
C-ROT
RF SWP
REC.P
SP
ORC2
CN802
1 N.C.
2 SW 5V
3 REC RF
4 SW 9V
5 C.SYNC
6 C.ROT
7 SP
8 GND
9 PB C
10 GND
11 PB Y.RF
CN804
1 PB RF
2 RF SWP
3 GND
CHECK PIN
CN803
1 ORC (2)
2 ORC (1)
3 JOG
4 N.C.
5 RF SWP
6 HEAD CONT
7 REC P
8 REC
②
③
⑤
9
10
11
12
13
14
15
16
17
18
19
20

HEA

RP-163 BOARD


① CN801 ② 1 V/DIV 20 μs/DIV REC

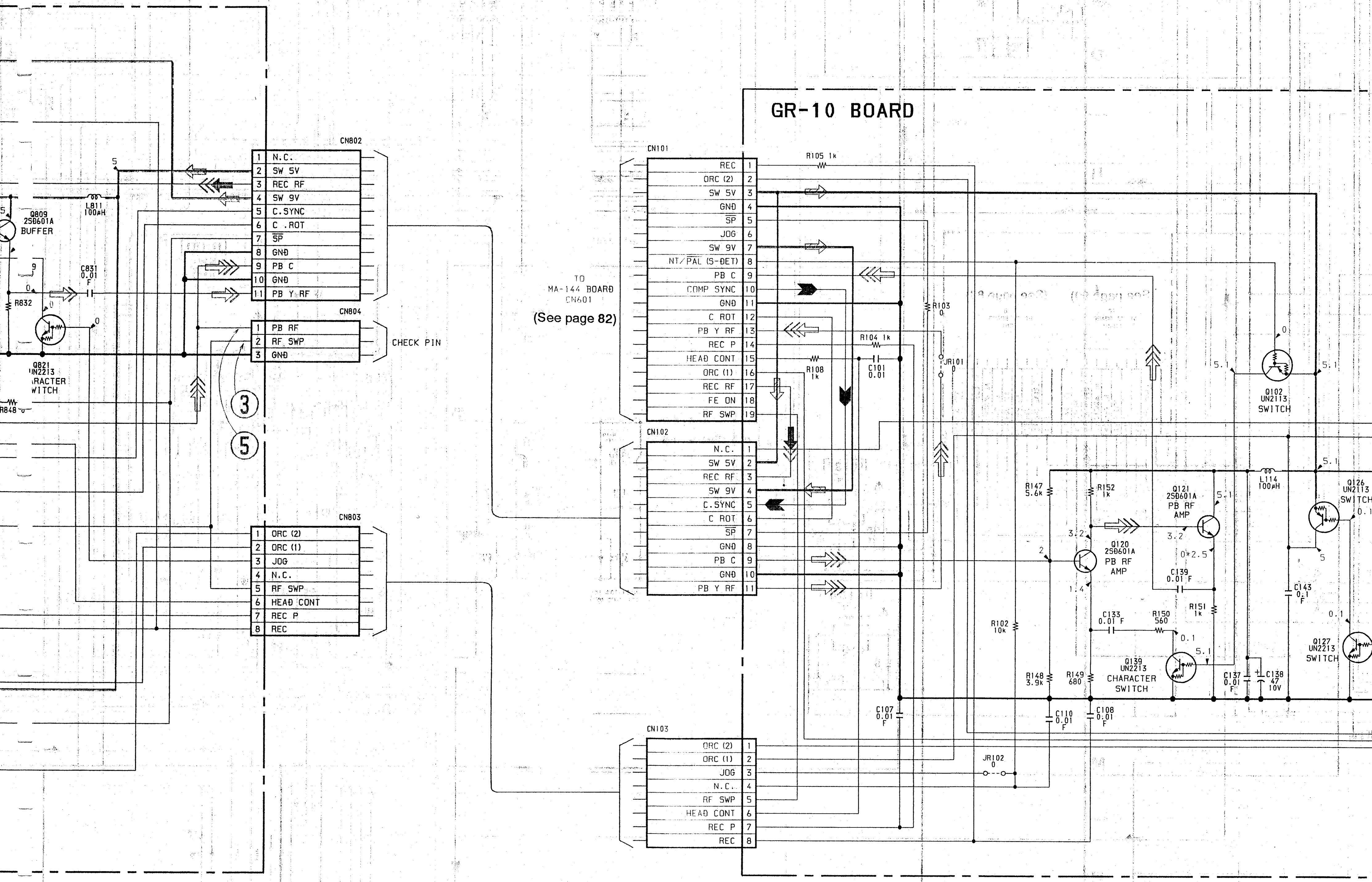
③ CN804 ② 2 V/DIV 10 ms/DIV PAL, SECAM REC/PB

④ CN801 ① 20 mV/DIV 10 μs/DIV PAL, SECAM PB

② IC801 ㉙ 100 mV/DIV 20 μs/DIV REC

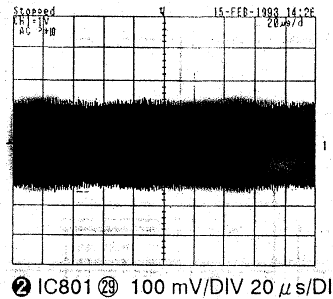
③ CN804 ② 2 V/DIV 10 ms/DIV 4.43 REC/PB

⑤ CN804 ① 200 mV/DIV 10ms/DIV 4.43 PB

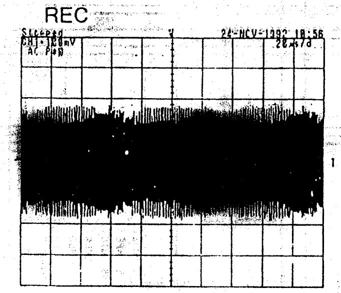

CN802
1 N.C.
2 SW 5V
3 REC RF
4 SW 9V
5 C.SYNC
6 C.ROT
7 SP
8 GND
9 PB C
10 GND
11 PB Y RF
CN804
1 PB RF
2 RF SWP
3 GND
CHECK PIN
CN803
1 ORC (2)
2 ORC (1)
3 JOG
4 N.C.
5 RF SWP
6 HEAD CONT
7 REC P
8 REC
Q809 2SD601A BUFFER
L811 100μH
C831 0.01 F
R832
Q821 UN2213 CHARACTER SWITCH
R848
③
⑤
GR-10 BOARD
CN101
REC 1
ORC (2) 2
SW 5V 3
GND 4
SP 5
JOG 6
SW 9V 7
NT/PAL (S-DET) 8
PB C 9
COMP SYNC 10
GND 11
C ROT 12
PB Y RF 13
REC P 14
HEAD CONT 15
ORC (1) 16
REC RF 17
FE ON 18
RF SWP 19
TO MA-144 BOARD CN601
(See page 82)
CN102
N.C. 1
SW 5V 2
REC RF 3
SW 9V 4
C.SYNC 5
C ROT 6
SP 7
GND 8
PB C 9
GND 10
PB Y RF 11
CN103
ORC (2) 1
ORC (1) 2
JOG 3
N.C. 4
RF SWP 5
HEAD CONT 6
REC P 7
REC 8
R105 1k
R103 0
R104 1k
R108 1k
C101 0.01
JR101 0
JR102 0
Q102 UN2113 SWITCH
L114 100μH
Q126 UN2113 SWITCH
Q121 2SD601A PB RF AMP
Q120 2SD601A PB RF AMP
R147 5.6k
R152 1k
C139 0.01 F
C133 0.01 F
R150 560
R151 1k
R102 10k
Q139 UN2213 CHARACTER SWITCH
R148 3.9k
R149 680
C137 0.01 F
C138 47 10V
C143 0.1 F
Q127 UN2213 SWITCH
C107 0.01 F
C110 0.01 F
C108 0.01 F
5.1
3.2
2
1.4
0.1
0.2.5

RP-163 BOARD

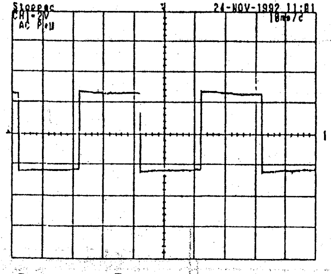
❶ CN801 ② 1 V/DIV 20 μs/DIV
REC



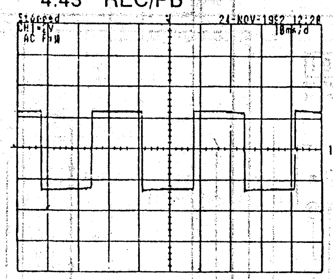
❷ IC801 ㉙ 100 mV/DIV 20 μs/DIV
REC



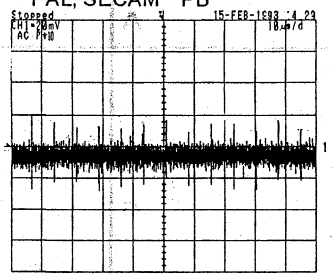
❸ CN804 ② 2 V/DIV 10 ms/DIV
PAL, SECAM REC/PB



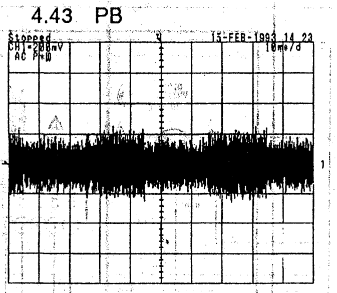
❸ CN804 ② 2 V/DIV 10 ms/DIV
4.43 REC/PB



❹ CN801 ① 20 mV/DIV 10 μs/DIV
PAL, SECAM PB



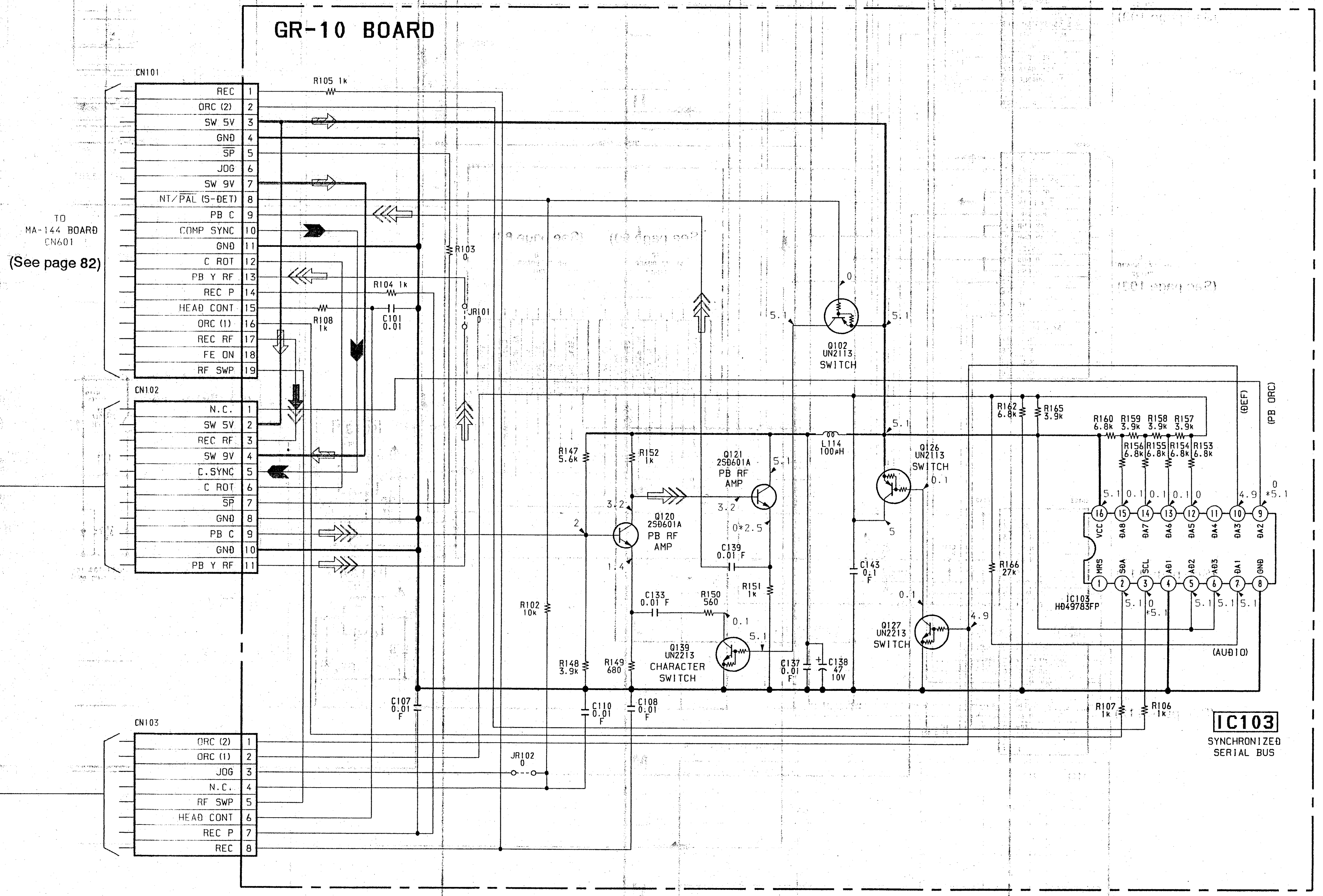
❺ CN804 ① 200 mV/DIV 10ms/DIV
4.43 PB



No mark : COMMON (PAL REC)
* : PAL PB
《 》 : SECAM REC
《* 》 : SECAM PB
[ ] : NTSC4.43 REC
[*] : NTSC4.43 PB
: Impossible to measure the voltage at the marked points.

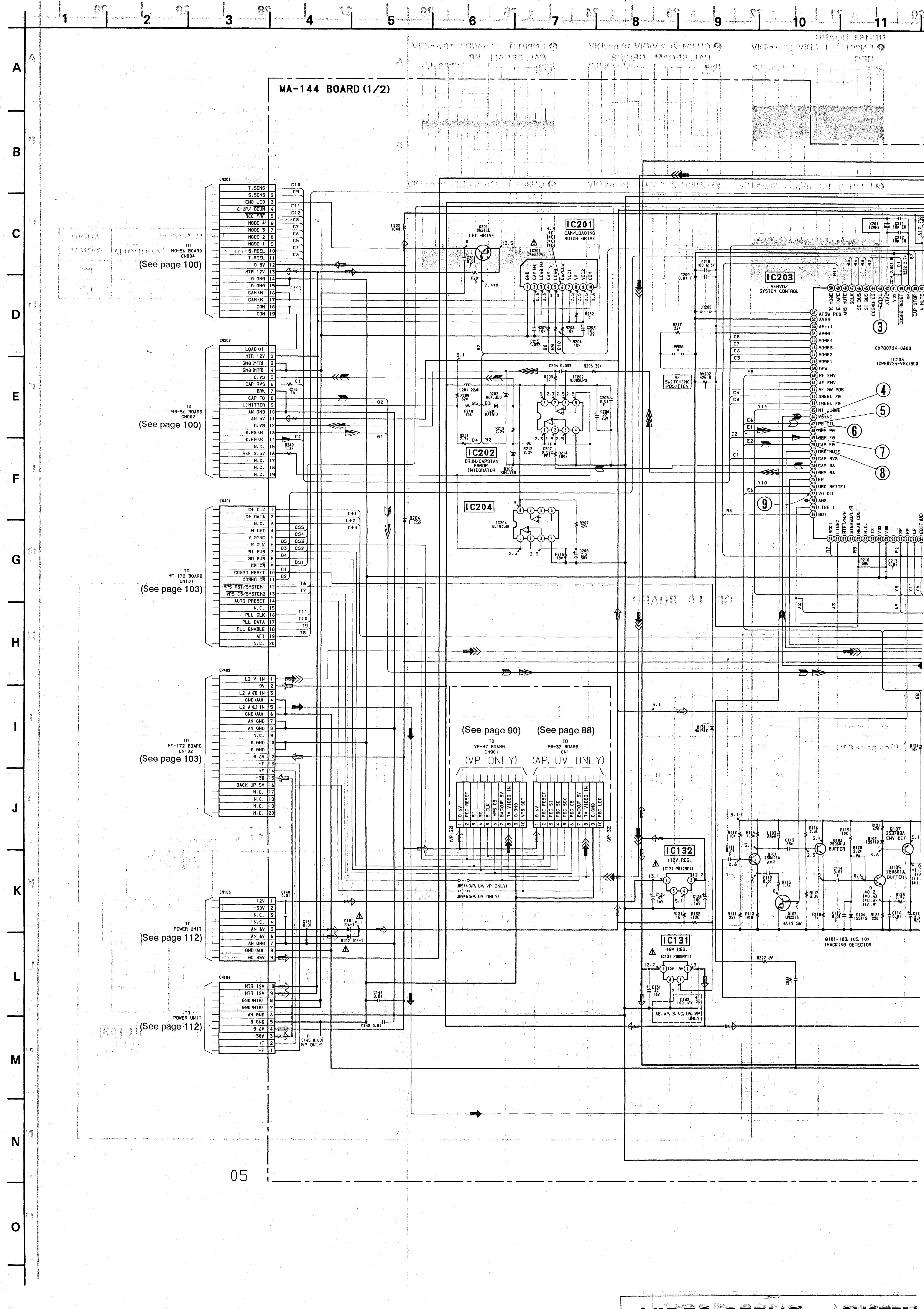
- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡»	➡⋙	➡
PB	⇨	⇨»	⇨⋙	⇨


GR-10 BOARD
TO
MA-144 BOARD
CN601
(See page 82)
CN101
REC 1
ORC (2) 2
SW 5V 3
GND 4
SP 5
JOG 6
SW 9V 7
NT/PAL (S-DET) 8
PB C 9
COMP SYNC 10
GND 11
C ROT 12
PB Y RF 13
REC P 14
HEAD CONT 15
ORC (1) 16
REC RF 17
FE ON 18
RF SWP 19
CN102
N.C. 1
SW 5V 2
REC RF 3
SW 9V 4
C.SYNC 5
C ROT 6
SP 7
GND 8
PB C 9
GND 10
PB Y RF 11
CN103
ORC (2) 1
ORC (1) 2
JOG 3
N.C. 4
RF SWP 5
HEAD CONT 6
REC P 7
REC 8
R105 1k
R103 0
R104 1k
R108 1k
C101 0.01
JR101 0
JR102 0
R102 10k
R147 5.6k
R148 3.9k
R149 680
R152 1k
C107 0.01 F
C110 0.01 F
C108 0.01 F
Q102 UN2113 SWITCH
Q120 2SD601A PB RF AMP
Q121 2SD601A PB RF AMP
Q139 UN2213 CHARACTER SWITCH
C133 0.01 F
R150 560
R151 1k
C139 0.01 F
L114 100μH
C137 0.01 F
C138 47 10V
C143 0.1 F
Q126 UN2113 SWITCH
Q127 UN2213 SWITCH
R162 6.8k
R165 3.9k
R166 27k
R160 6.8k
R159 3.9k
R158 3.9k
R157 3.9k
R156 6.8k
R155 6.8k
R154 6.8k
R153 6.8k
R107 1k
R106 1k
(DEF)
(PB ORC)
(AUDIO)
VCC DA8 DA7 DA6 DA5 DA4 DA3 DA2
MRS SDA SCL AD1 AD2 AD3 DA1 GND
IC103 HD49783FP
IC103
SYNCHRONIZED SERIAL BUS
0
5.1
3.2
2
1.4
0*2.5
0.1
5
4.9
*5.1

MA-144 (VIDEO, SERVO, SYSTEM CONTROL, AUDIO) SCHEMATIC DIAGRAM • See pages 87, 95 for Waveforms.

– Ref. No.: MA-144 Board; 2,000 series –



1
2
3
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5
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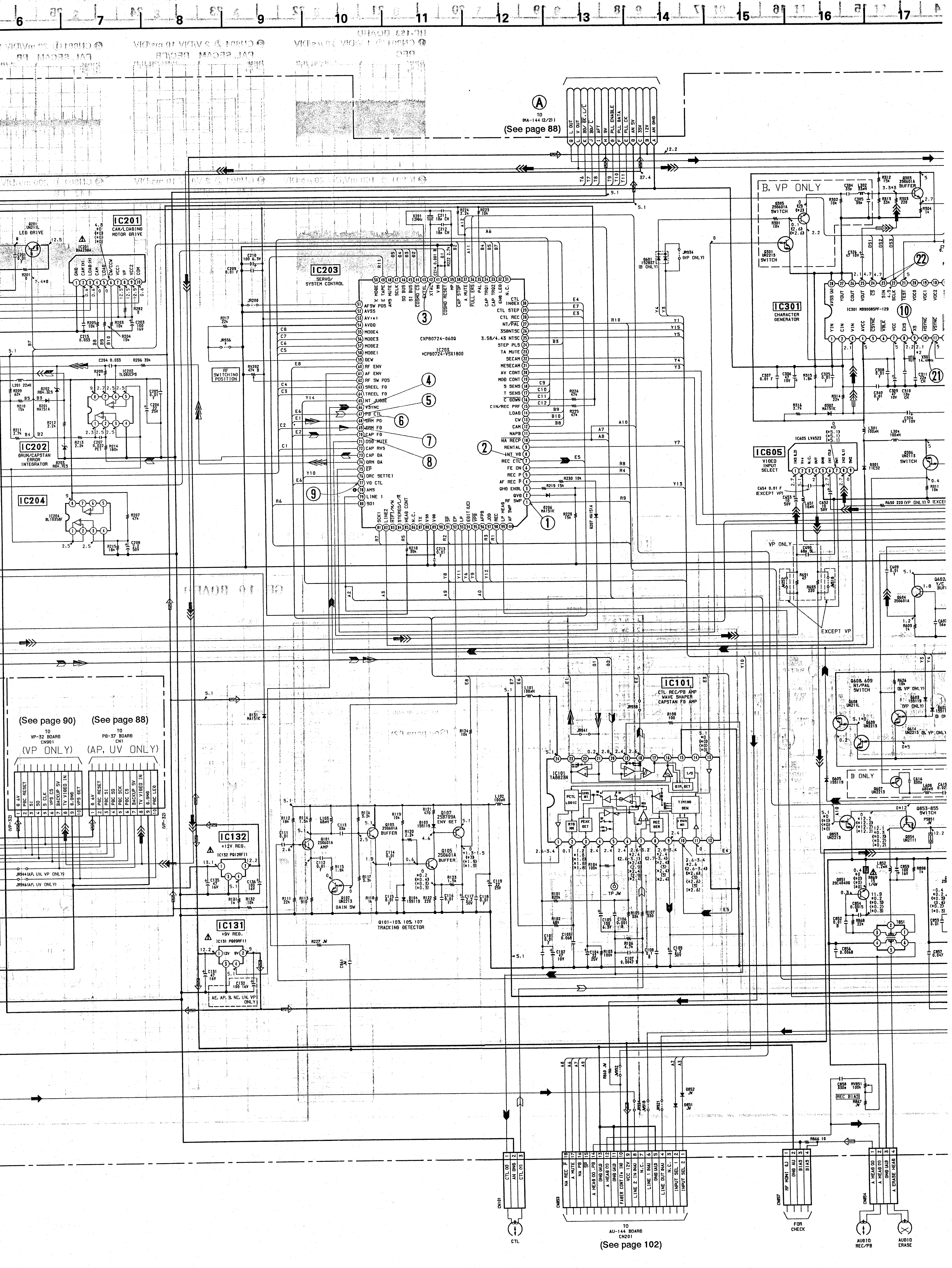
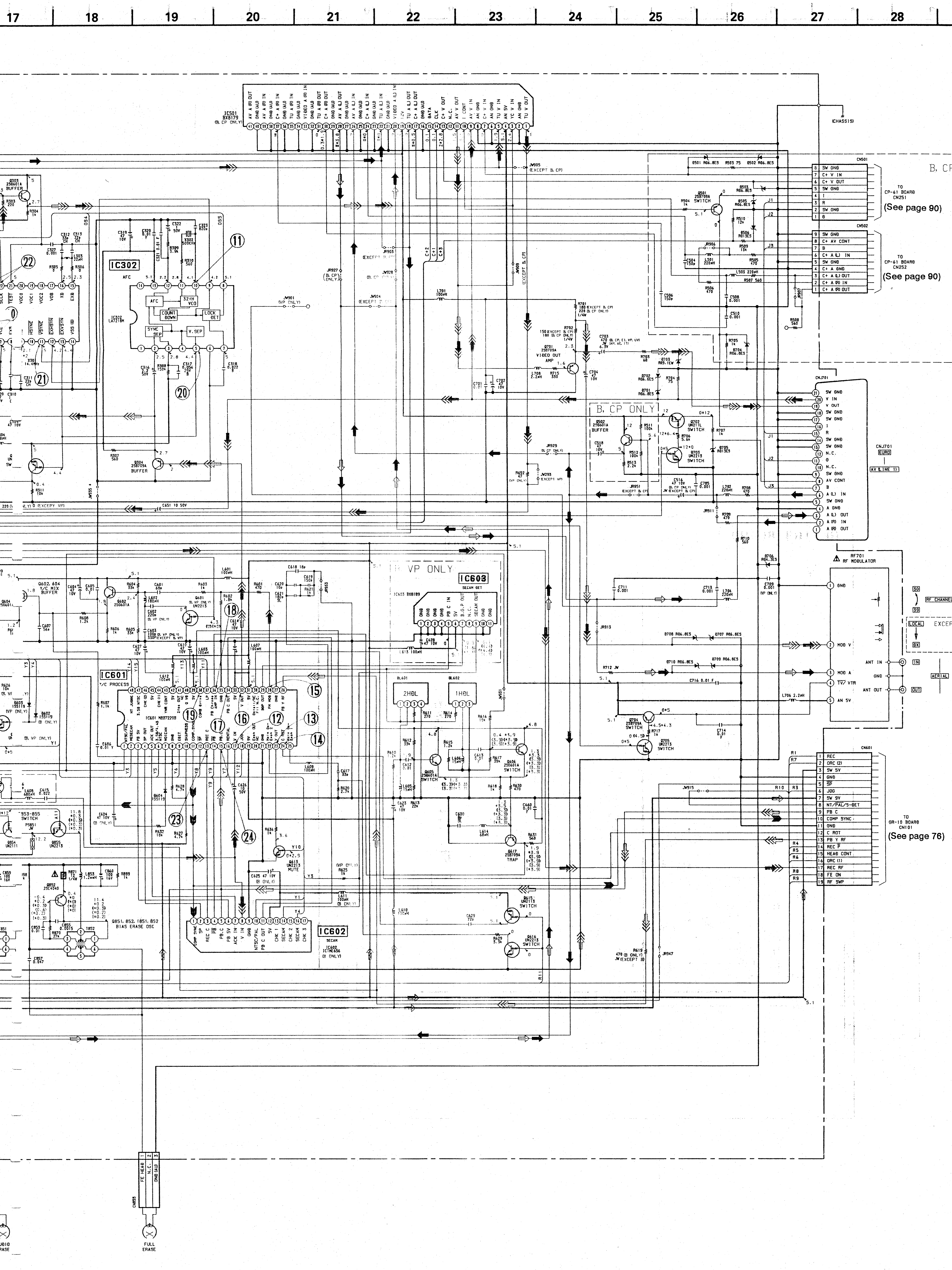
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
MA-144 BOARD (1/2)
CN201
T.SENS
S.SENS
END LED
C-UP/ DOWN
REC PRF
MODE 4
MODE 3
MODE 2
MODE 1
S.REEL
T.REEL
0 5V
MTR 12V
D GND
D GND
CAM (+)
CAM (+)
COM
COM
TO MD-56 BOARD CN004
(See page 100)
CN202
LOAD (+)
MTR 12V
GND (MTR)
GND (MTR)
C.VS
CAP.RVS
BRK
CAP FG
LIMITTER
AN GND
AN 5V
D.VS
D.PG (+)
D.FG (+)
N.C.
REF 2.5V
N.C.
N.C.
N.C.
TO MD-56 BOARD CN007
(See page 100)
CN401
C+ CLK
C+ DATA
N.C.
H DET
V SYNC
S CLK
SI BUS
SO BUS
CG CS
COSMO RESET
COSMO CS
VPS RST/SYSTEM1
VPS CS/SYSTEM2
AUTO PRESET
N.C.
PLL CLK
PLL DATA
PLL ENABLE
AFT
N.C.
TO MF-172 BOARD CN101
(See page 103)
CN402
L2 V IN
9V
L2 A (R) IN
GND (AU)
L2 A (L) IN
GND (AU)
AN GND
AN GND
N.C.
D GND
D GND
D 6V
-F
+F
-30
BACK UP 5V
N.C.
N.C.
N.C.
N.C.
TO MF-172 BOARD CN102
(See page 103)
CN103
12V
-30V
N.C.
N.C.
AN 6V
AN 6V
AN GND
GND (AU)
DC 35V
TO POWER UNIT
(See page 112)
CN104
MTR 12V
MTR 12V
GND (MTR)
GND (MTR)
AN GND
D GND
D 6V
-30V
+F
-F
TO POWER UNIT
(See page 112)
Q201 UN211L LED DRIVE
IC201 CAM/LOADING MOTOR DRIVE
IC201 BA6238A
IC202 DRUM/CAPSTAN ERROR INTEGRATOR
IC202 TL082CPS
IC204
IC204 BL10358F
IC203 SERVO/ SYSTEM CONTROL
CXP80724-060Q
IC203 *CXP80724-VSX1800
RF SWITCHING POSITION
AFSW POS
AVSS
AVref
AVDD
MODE4
MODE3
MODE2
MODE1
DEW
RF ENV
AF ENV
RF SW POS
SREEL FG
TREEL FG
NT JUDGE
V SYNC
PB CTL
DRM PG
DRM FG
CAP FG
OSD MUTE
CAP RVS
CAP DA
DRM DA
EP
DRC SETTEI
VD CTL
AMS
LINE 1
SO1
X201 12MHz
(See page 90)
(See page 88)
TO VP-32 BOARD CN901
TO PD-37 BOARD CN1
(VP ONLY)
(AP, UV ONLY)
B.6V
PBC RESET
SI
SO
S.CLK
VPS CS
BACKUP 5V
TV VIDEO IN
D.GND
VPS DET
PBC SI
PBC SO
PBC SCK
PBC CS
TV VIDEO IN
PBC LED
JR944 (AP, UV, VP ONLY)
JR946 (AP, UV ONLY)
IC132 +12V REG.
IC132 PQ12RF11
IC131 +9V REG.
IC131 PQ09RF11
AE, AP, B, NC, UV, VP ONLY
Q101 Q102 10E-1
D204 11ES2
Q101 2SD601A AMP
Q102 UN2213 GAIN SW
Q103 2SD601A BUFFER
Q105 2SD601A BUFFER
Q107 2SB709A ENV DET
Q101-103, 105, 107 TRACKING DETECTOR
C145 0.001 (VP ONLY)
③
④
⑤
⑥
⑦
⑧
⑨
05

VIDEO SERVO SYSTEM

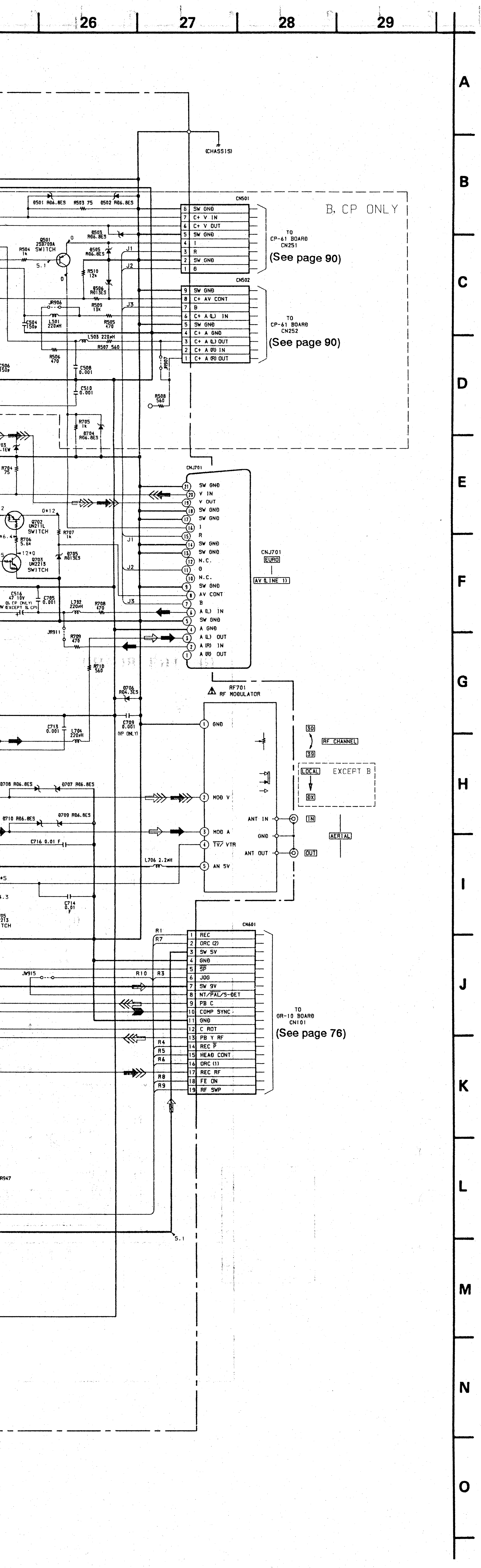
RAM • See pages 87, 95 for Waveforms.


6
7
8
9
10
11
12
13
14
15
16
17
TO (MA-144 (2/2))
(See page 88)
IC201 CAM/LOADING MOTOR DRIVE
IC201 BA6238A
Q201 UN211L LED DRIVE
IC202 DRUM/CAPSTAN ERROR INTEGRATOR
IC203 SERVO/SYSTEM CONTROL
IC203 CXP80724-060Q
*CXP80724-V5X1800
IC204 BL10358F
IC205 TL082CPS
RF SWITCHING POSITION
IC301 CHARACTER GENERATOR
IC301 MB90085PF-129
B, VP ONLY
Q305 2SD601A SWITCH
Q303 2SD601A BUFFER
IC605 VIDEO INPUT SELECT
IC605 LVA522
VP ONLY
EXCEPT VP
Q608, 609 NT/PAL SWITCH
B ONLY
Q853-855 SWITCH
REC BIAS
IC101 CTL REC/PB AMP WAVE SHAPER CAPSTAN FG AMP
IC101 TA8823N
TIMING GEN
Q101-103 105 107 TRACKING DETECTOR
Q101 2SD601A AMP
Q102 UN2213 GAIN SW
Q103 2SD601A BUFFER
Q105 2SD601A BUFFER
Q107 2SB709A ENV DET
IC132 +12V REG.
IC132 PQ12RF11
IC131 +9V REG.
IC131 PQ09RF11
AE, AP, B, NC, UV, VP ONLY
(See page 90)
TO VP-32 BOARD CN901
(VP ONLY)
(See page 88)
TO PB-37 BOARD CN1
(AP, UV ONLY)
TP JW
CN101
CTL
CN853
TO AU-144 BOARD CN201
(See page 102)
CN857
FOR CHECK
CN854
AUDIO REC/PB
AUDIO ERASE

VIDEO SERVO SYSTEM CONTROL, AUDIO


17
18
19
20
21
22
23
24
25
26
27
28
JC501 BX8179 (B, CP ONLY)
(CHASSIS)
CN501
TO CP-61 BOARD CN251
(See page 90)
CN502
TO CP-61 BOARD CN252
(See page 90)
B, CP
Q303 2SC601A BUFFER
IC302
AFC
IC302 LA7218M
COUNT DOWN
32fH VCO
LOCK DET
SYNC SEP
V. SEP
Q304 2SB709A BUFFER
Q701 2SB709A VIDEO OUT AMP
Q501 2SB709A SWITCH
B, CP ONLY
Q502 2SC601A BUFFER
Q702 UN211L SWITCH
Q703 UN2213 SWITCH
CNJ701
CNJ701 EURO
AV (LINE 1)
RF701 RF MODULATOR
RF CHANNEL
LOCAL
EXCEP
DX
ANT IN
ANT OUT
AERIAL
IN
OUT
Q704 2SB709A SWITCH
Q705 UN2213 SWITCH
VP ONLY
IC603
SECAM DET
IC603 BX8189
Q602, 604 Y/C MIX BUFFER
Q601 (VP ONLY) UN2213
IC601
Y/C PROCESS
IC601 M83722GB
DL601 2HDL
DL602 1HDL
Q605 2SC601A SWITCH
Q606 2SC601A SWITCH
Q617 2SB709A TRAP
Q613 UN2213 MUTE
Q615 UN2213 SWITCH
Q616 UN2213 SWITCH
IC602
SECAM
IC602 ICTHE656 (B ONLY)
Q851, 852, T851, 852 BIAS ERASE OSC
CN601
TO GR-10 BOARD CN101
(See page 76)
CN855
FE HEAD
N.C.
GND (A.U)
FULL ERASE
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)
(21)
(22)
(23)
(24)

VIDEO SERVO SYSTEM CONTROL, A


26
27
28
29
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
(CHASSIS)
B, CP ONLY
CN501
8 SW GND
7 C+ V IN
6 C+ V OUT
5 SW GND
4 I
3 R
2 SW GND
1 G
TO
CP-61 BOARD
CN251
(See page 90)
CN502
9 SW GND
8 C+ AV CONT
7 B
6 C+ A (L) IN
5 SW GND
4 C+ A GND
3 C+ A (L) OUT
2 C+ A (R) IN
1 C+ A (R) OUT
TO
CP-61 BOARD
CN252
(See page 90)
D501 R06.8ES
R503 75
D502 R06.8ES
D503 R06.8ES
Q501 2SB709A SWITCH
R504 1k
5.1
D505 R06.8ES
R510 12k
D506 R013ES
R509 13k
JR906
L501 220μH
C504 150p
R505 470
L503 220μH
R507 560
R506 470
C506 150p
C508 0.001
C510 0.001
JR907
R508 560
J1
J2
J3
R705 1k
D704 R06.8ES
R704 75
Q702 UN211L SWITCH
0*12
*6.4
R706 5.6k
R707 1k
12*0
Q703 UN2213 SWITCH
D705 R013ES
C516 47 10V (B, CP ONLY)
(EXCEPT B, CP)
C705 0.001
L702 220μH
R708 470
JR911
R709 470
R710 560
CNJ701
21 SW GND
20 V IN
19 V OUT
18 SW GND
17 SW GND
16 I
15 R
14 SW GND
13 SW GND
12 N.C.
11 G
10 N.C.
9 SW GND
8 AV CONT
7 B
6 A (L) IN
5 SW GND
4 A GND
3 A (L) OUT
2 A (R) IN
1 A (R) OUT
CNJ701
EURO
AV (LINE 1)
D706 R04.3ES
C709 0.001 (VP ONLY)
C713 0.001
L704 220μH
RF701
RF MODULATOR
1 GND
2 MOD V
3 MOD A
4 TV/ VTR
5 AN 5V
ANT IN
GND
ANT OUT
30
39
RF CHANNEL
LOCAL
DX
EXCEPT B
IN
OUT
AERIAL
D708 R06.8ES
D707 R06.8ES
D710 R06.8ES
D709 R06.8ES
C716 0.01 F
L706 2.2μH
*5
C714 0.01 F
CN601
1 REC
2 ORC (2)
3 SW 5V
4 GND
5 SP
6 JOG
7 SW 9V
8 NT/PAL/S-DET
9 PB C
10 COMP SYNC
11 GND
12 C ROT
13 PB Y RF
14 REC P
15 HEAD CONT
16 ORC (1)
17 REC RF
18 FE ON
19 RF SWP
R1
R7
R10
R3
R4
R5
R6
R8
R9
JW915
TO
GR-10 BOARD
CN101
(See page 76)
R947
5.1

No mark : COMMON (PAL REC)
* : PAL PB
《 》 : SECAM REC
《* 》 : SECAM PB
[ ] : NTSC4.43 REC
[*] : NTSC4.43 PB
# : Impossible to measure the voltage at the marked points.

- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡»	➡»»	➡
PB	⇨	⇨»	⇨»»	⇨

- Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷»	
Drum servo (speed and phase)		▷»»	
Capstan speed servo		➣	
Capstan phase servo	➤»	➣»	⊃»
Capstan servo (speed and phase)		➣»»	
Ref. signal	➤		⊃

RVO SYSTEM CONTROL, AUDIO

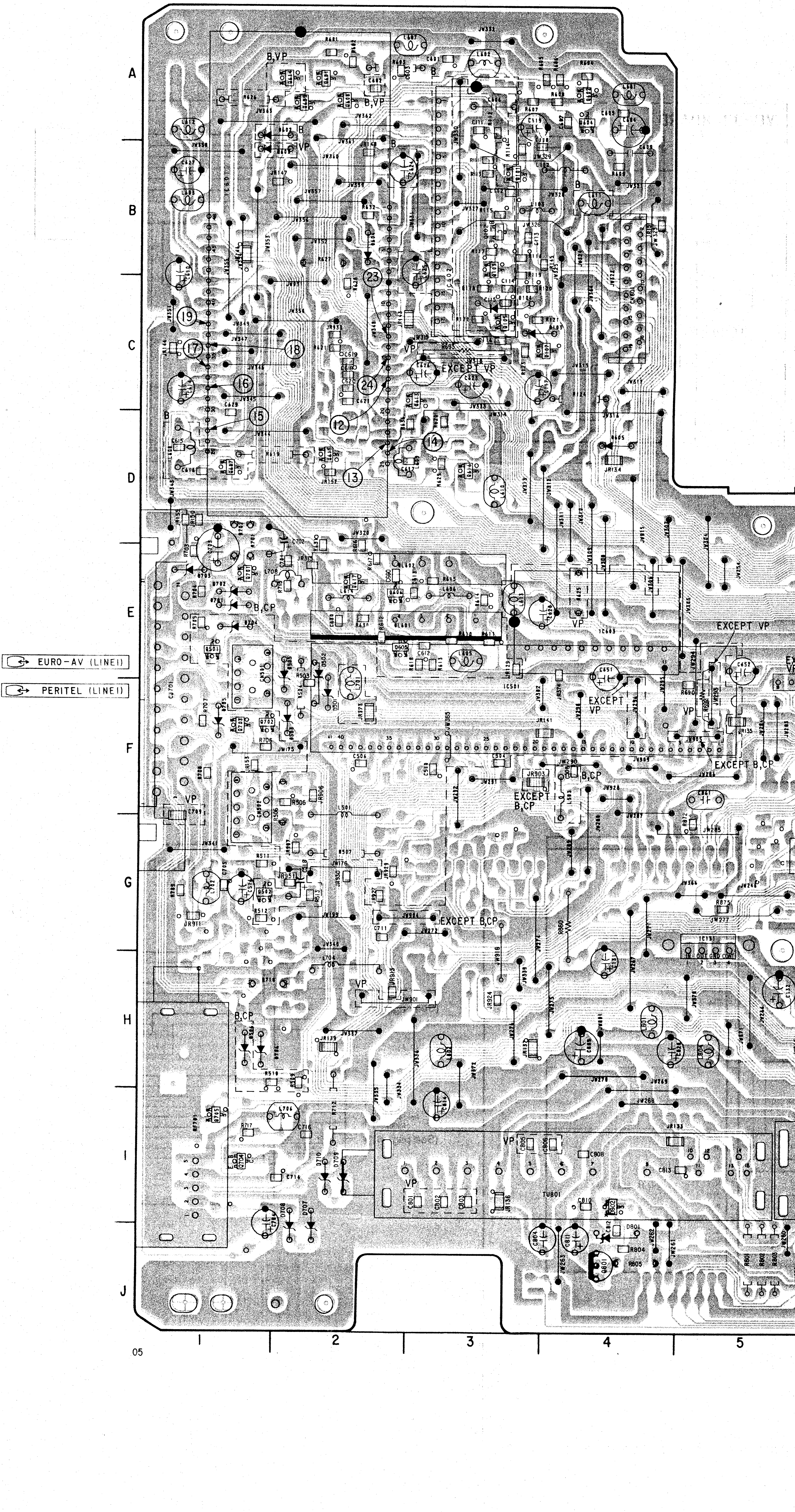
MA-144 (VIDEO, SERVO, SYSTEM CONTROL, AUDIO) PRINTED WIRING BOARD

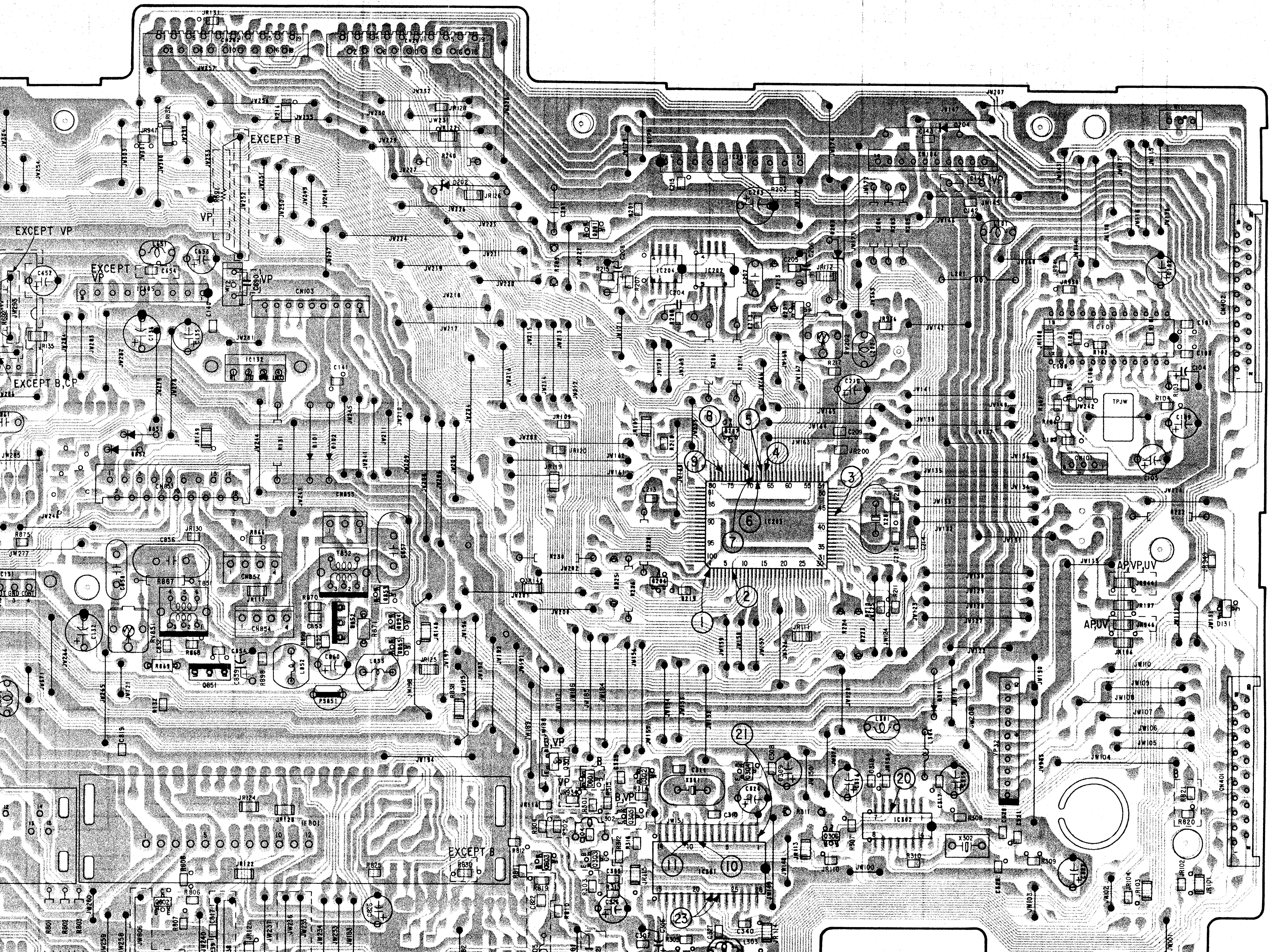
– Ref. No.: MA-144 Board; 2,000 series –

MA-144 BOARD

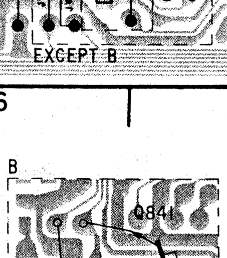
CN032	
CN101	G-12
CN103	F-7
CN104	E-14
CN201	D-7
CN202	D-6
CN401	H-13
CN402	E-13
CN501	E-1
CN502	F-1
CN601	B-4
CN853	G-6
CN854	H-6
CN855	G-7
CN857	G-6
D101	G-7
D102	G-7
D103	C-3
D104	C-3
D131	H-13
D201	F-10
D202	E-8
D203	E-10
D204	D-11
D206	G-9
D207	F-10
D301	H-11
D302	I-9
D501	F-2
D502	E-2
D503	F-2
D505	E-2
D506	H-1
D601	I-9
D602	A-1
D603	B-1
D604	B-2
D605	D-4
D701	E-1
D702	E-1
D703	E-1
D704	E-1
D705	F-1
D706	H-1
D707	I-2
D708	I-2
D709	I-2
D710	I-2
D801	J-4
D802	I-4
D851	F-6
D852	G-5
D853	G-5
D854	G-5
IC101	F-12
IC131	G-5
IC132	F-6
IC201	E-9
IC202	E-10
IC203	G-10
IC204	E-9
IC301	I-9
IC302	I-11
IC501	F-3
IC601	A-1
IC602	B-3
IC603	E-4
IC605	E-6
Q101	B-3
Q102	B-3
Q103	B-3
Q105	C-3
Q107	C-3
Q201	E-9
Q301	I-8
Q303	I-9
Q304	I-10
Q305	I-9
Q306	I-10
Q501	E-1
Q502	G-1
Q503	G-1
Q601	A-2
Q602	A-4
Q603	A-3
Q604	A-4
Q605	E-2
Q606	E-2
Q607	D-1
Q608	A-2
Q609	A-2
Q613	C-3
Q614	A-2
Q615	D-2
Q616	D-3
Q617	E-2
Q701	E-1
Q702	F-1
Q703	F-1
Q704	I-1
Q705	I-1
Q801	J-4
Q803	I-8
Q851	H-6
Q852	H-7
Q853	H-7
Q854	H-7
Q855	H-7
Q856	G-5

MA-144 BOARD




EXCEPT B
VP
EXCEPT VP
EXCEPT
VP
EXCEPT B,CP
CN103
IC152
CN853
CN852
CN854
CN855
IE801
IC204
IC202
IC201
IC301
IC302
X301
X302
TPJW
AP,VP,UV
AP,UV
CN401
CN402
1-646-739-
13
5
6
7
8
9
10
11
12
13

B


Q841
Q840

IC203 VOLTAGE VALUES

Color system	Pin No.	①	②	③	④
PAL	REC	2.1-3	0	0	5.1
	PB	2.1-3	0	0	0
SECAM	REC	2.1-3	0	0	5.1
	PB	2.1-3	0	0	0
NTSC 4.43	REC	2.1-3	0	0	5.1
	PB	2.1-3	0	0	0

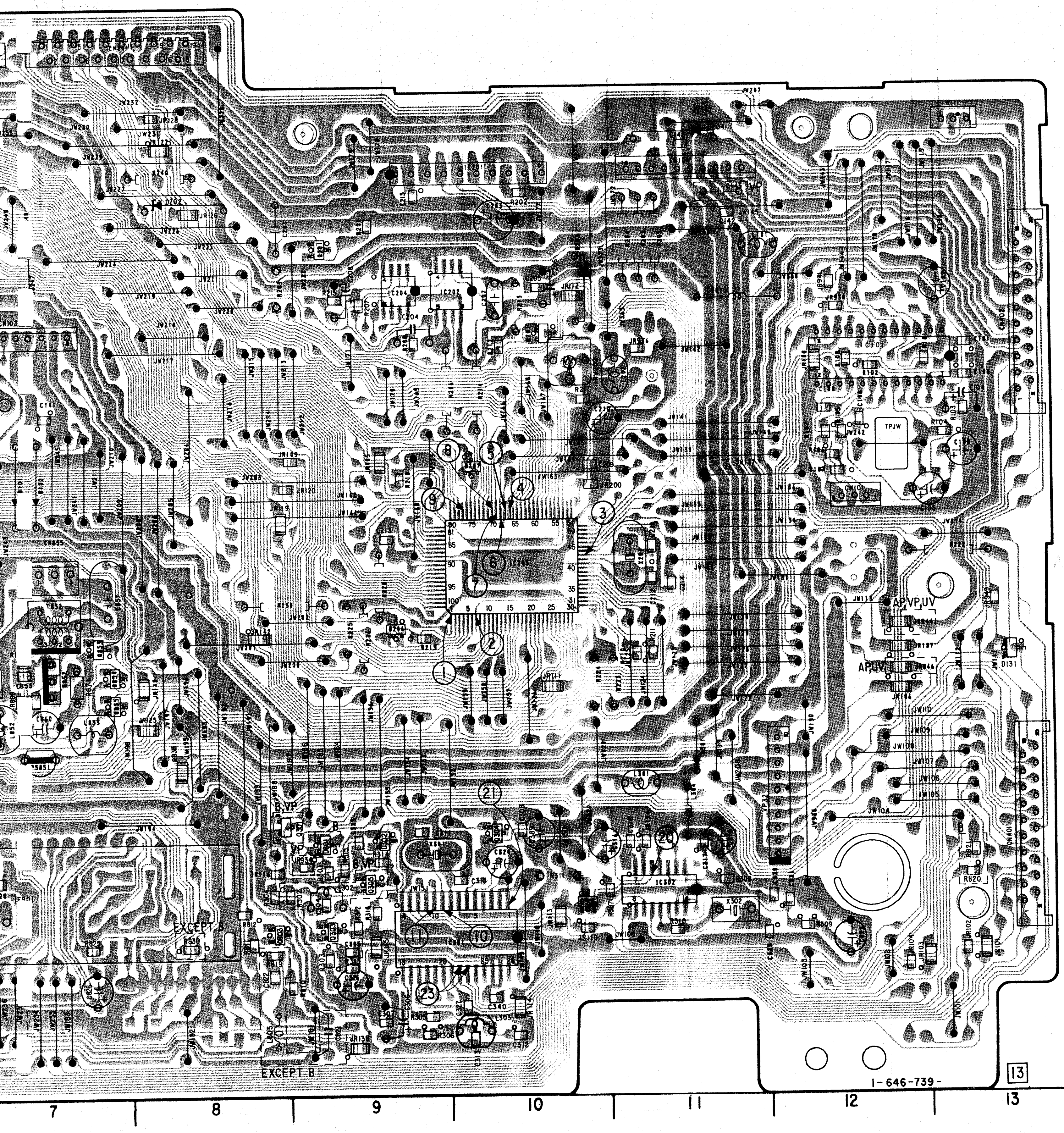
Color system	Pin No.	⑱	⑲	⑳	㉑
PAL	REC	0	5	5	0.5
	PB	0	5	5	0.7
SECAM	REC	0	5	5.1	4
	PB	0	5	5	4
NTSC 4.43	REC	0	5	5.1	0.6
	PB	0	5	5.1	0.7

Color system	Pin No.	㉟	㊱	㊲	㊳
PAL	REC	0	0	0.2	2.3
	PB	5.2	12.1	0.2	2.3
SECAM	REC	5.1	0	0.2	2.3
	PB	4.4	12.1	0.2	2.3
NTSC 4.43	REC	5.1	0	0.2	2.3
	PB	5.2	12.1	0.2	2.3

Color system	Pin No.	(52)	(53)	(54)	(55)
PAL	REC	GND	5.2	5.2	0
	PB	GND	5.2	5.2	0
SECAM	REC	GND	5.2	5.2	0
	PB	GND	5.2	5.2	0
NTSC 4.43	REC	GND	5.2	5.2	0
	PB	GND	5.2	5.2	0

Color system	Pin No.	(69)	(70)	(71)	(72)
PAL	REC	3.4	2.6	0	0
	PB	3.4	2.6	0	0
SECAM	REC	3.4	2.6	0	0
	PB	3.4	2.6	0	0
NTSC 4.43	REC	3.4	2.6	0	0
	PB	3.4	2.6	0	0

Color system	Pin No.	(86)	(87)	(88)	(89)
PAL	REC			GND	5.
	PB			GND	5.
SECAM	REC			GND	5.
	PB			GND	5.
NTSC 4.43	REC			GND	5.
	PB			GND	5.

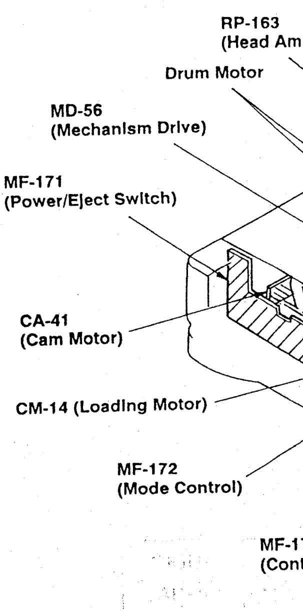

IC203
IC204
IC202
IC201
IC801
IC302
TPJW
AP VP UV
APUV
EXCEPT B
1-646-739-
13
7
8
9
10
11
12
13

IC601 VOLTAGE VALUES

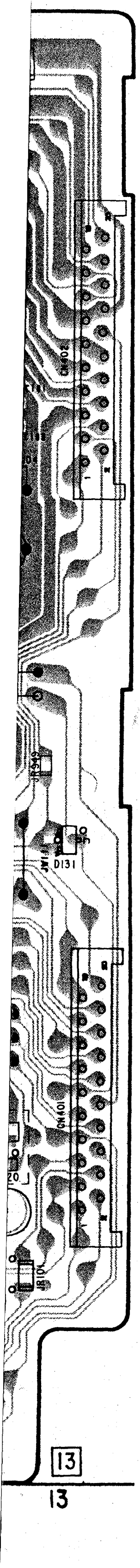
Color system	Pin No.	①	②	③	
PAL	REC	0.2	0.4	0	4
	PB	5	0.1	4.8	4
SECAM	REC	0.2	0.5	0	4
	PB	5	0	4.8	4
NTSC 4.43	REC	0.2	0.1	0	4
	PB	0.2	0	4.8	4

Color system	Pin No.	⑱	⑲	⑳	
PAL	REC	0	8.9		G
	PB	0	8.9		G
SECAM	REC	0	8.9		G
	PB	0	8.9		G
NTSC 4.43	REC	0	8.9		G
	PB	0	8.9		G

Color system	Pin No.	㉟	㊱	㊲
PAL	REC	GND	1.9	0
	PB	GND	1.9	0
SECAM	REC	GND	1.9	0
	PB	GND	1.9	0
NTSC 4.43	REC	GND	2	0
	PB	GND	2	0


RP-163
(Head Am
Drum Motor
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
MF-172
(Mode Control)
MF-1
(Cont

VIDEO SERVO   SYSTEM CONTROL



IC203 VOLTAGE VALUES

Color system \ Pin No.		①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰
PAL	REC	2.1-3	0	0	5.1	0	5	2.6-3.4		0	5.1	0	0	5.1	0	5.1	0	0
	PB	2.1-3	0	0	0	0	0	2.6		0	0	5.1	0	0	0	5.1	0	0
SECAM	REC	2.1-3	0	0	5.1	0	5	2.6-3.4		0	5.1	0	0	5.1	0	5.1	0	0
	PB	2.1-3	0	0	0	0	0	2.6		0	0	5.1	0	0	0	5.1	0	0
NTSC 4.43	REC	2.1-3	0	0	5.1	0	5	2.6-3.4		0	5.1	0	0	5.1	0	5.1	0	0
	PB	2.1-3	0	0	0	0	0	2.6		0	0	5.1	0	0	0	5.1	0	0

Color system \ Pin No.		⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜	㉝	㉞
PAL	REC	0	5	5	0.5	0	0	0	0	0	0	5.1	0	0		7.3-7.9	0	0
	PB	0	5	5	0.7	0	0	0	0	0	0	0	0	0		7.2-7.6	0.5	0.5
SECAM	REC	0	5	5.1	4	0.4	0	0	0	0	0	5.1	0	0		7.4-7.8	0.5	0.5
	PB	0	5	5	4	0	0	0	0	0	0	0	0	0		7.2-7.6	0.5	0.5
NTSC 4.43	REC	0	5	5.1	0.6	0	0	0	0	0	0	5.1	0	0		7.5-8	0.5	0.5
	PB	0	5	5.1	0.7	0	0	0	0	0	0	0	0	0		7.1-6	0.5	0.5

Color system \ Pin No.		㉟	㊱	㊲	㊳	㊴	㊵	㊶	㊷	㊸	㊹	㊺	㊻	㊼	㊽	㊾	㊿	(51)
PAL	REC	0	0	0.2	2.3	GND	5.1	0	2.4	2.4	5	4.7	2.1	3.2		5		2.2
	PB	5.2	12.1	0.2	2.3	GND	5.1	0	2.4	2.4	5	3.6	1.4	3.8		0		2.2
SECAM	REC	5.1	0	0.2	2.3	GND	5.1	0	2.4	2.4	5	4.7	1.4	4.7		0		2.2
	PB	4.4	12.1	0.2	2.3	GND	5.1	0	2.4	2.4	5	4.7	1.4	4.9		0		2.2
NTSC 4.43	REC	5.1	0	0.2	2.3	GND	5.1	0	2.4	2.4	5	4.7	1.4	4.7		0		2.2
	PB	5.2	12.1	0.2	2.3	GND	5.1	0	2.4	2.4	5	4.7	1.4	4.0		0		2.2

Color system \ Pin No.		(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)
PAL	REC	GND	5.2	5.2	0	5.2	0	5.2	0	0	0.8	2.5	#	#	0.2	0.4	2.6-3.4	0.1
	PB	GND	5.2	5.2	0	5.2	0	5.2	0	3.7	3.9	2.5	#	#	0.2	0.4	2.6-3.4	0.1
SECAM	REC	GND	5.2	5.2	0	5.2	0	5.2	0	0	0.8	2.5	#	#	0.2	0.4	2.6-3.4	0.3
	PB	GND	5.2	5.2	0	5.2	0	5.2	0	3.1	3.1	2.5	#	#	0.2	0.4	2.6-3.4	0.3
NTSC 4.43	REC	GND	5.2	5.2	0	5.2	0	5.2	0	0	0.8	2.5	#	#	0.2	0.4	2.6-3.4	0.4
	PB	GND	5.2	5.2	0	5.2	0	5.2	0	3.1	3.8	2.5	#	#	0.2	0.4	2.6-3.4	0.2

Color system \ Pin No.		(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)	(81)	(82)	(83)	(84)	(85)
PAL	REC	3.4	2.6	0	0	2.5	2.5	5.1	0	2.6-3.4		0	5	5.1	0	0	5.1	2.4
	PB	3.4	2.6	0	0	2.5	2.5	5.1	0	2.6-3.4		0	5	5.1	0	0	5.1	0
SECAM	REC	3.4	2.6	0	0	2.5	2.5	5.1	0	2.6-3.4		5.1	5	5.1	0	0	5.1	2.4
	PB	3.4	2.6	0	0	2.5	2.5	5.1	0	2.6-3.4		5.1	5	5.1	0	0	5.1	0
NTSC 4.43	REC	3.4	2.6	0	0	2.5	2.5	5.1	0	2.6-3.4		5.1	5	5.1	0	0	5.1	2.4
	PB	3.4	2.6	0	0	2.5	2.5	5.1	0	2.6-3.4		5.1	5	5.1	0	0	5.1	0

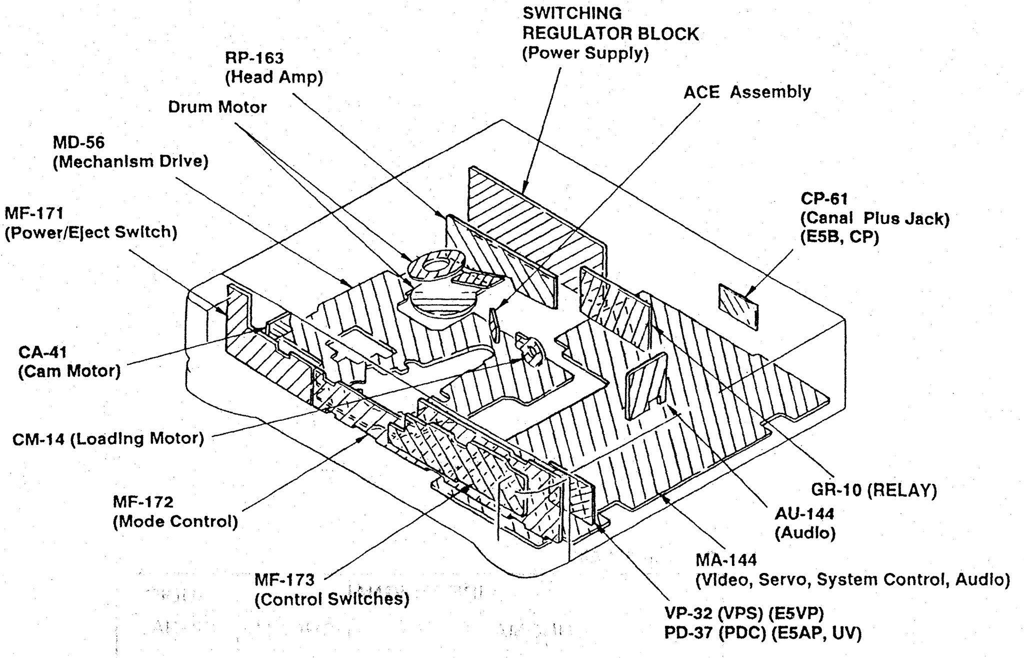
Color system \ Pin No.		(86)	(87)	(88)	(89)	(90)	(91)	(92)	(93)	(94)	(95)	(96)	(97)	(98)	(99)	(100)
PAL	REC			GND	5.2		0	0	0	0	5.1	0	0	5.1	0	2.1-3
	PB			GND	5.2		0	0	0	0	0.1	5.1	0	0	0	2.1-3
SECAM	REC			GND	5.2		0	0	0	0	5.1	0	0	5.1	0	2.1-3
	PB			GND	5.2		0	0	0	0	0.1	5.1	0	0	0	2.1-3
NTSC 4.43	REC			GND	5.2		0	0	0	0	5.1	0	0	5.1	0	2.1-3
	PB			GND	5.2		0	0	0	0	0.1	5.1	0	0	0	2.1-3

IC601 VOLTAGE VALUES

Color system \ Pin No.		①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰
PAL	REC	0.2	0.4	0	4.9	1.9	0	0	GND	0	2.6	0.5	0	1.3	5.1	0	0	3.2
	PB	5	0.1	4.8	4.9	1.9	0	4.1	GND	0	2.6	0.5	0	1.3	0.1	0	0	3.2
SECAM	REC	0.2	0.5	0	4.9	3	0	0	GND	0	2.6	0.5	0	1.3	5.1	0	0	3.2
	PB	5	0	4.8	4.9	1.9	0	4.1	GND	0	2.6	0.5	0	1.3	0.1	0	0	3.2
NTSC 4.43	REC	0.2	0.1	0	4.9	1.9	0	0	GND	0	2.6	0.5	0	1.3	5.1	0	0	3.2
	PB	0.2	0	4.8	4.9	1.9	0	4.1	GND	0	2.6	0.5	0	1.3	0.1	0	0	3.2

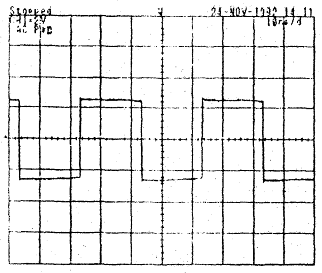
Color system \ Pin No.		⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜	㉝	㉞
PAL	REC	0	8.9		GND	2.4	3.6	1.8-2.6	1.8	0	GND	3	0.5	2.2	4.9	2	4.9	1.2
	PB	0	8.9		GND	2.1	3.3	2.1	2.7	0	GND	3.5	0.5	2.2	4.9	2	4.9	1.2
SECAM	REC	0	8.9		GND	2.4	3.6	1.8-2.6	1.8	0	GND	3	0.5	2.2	4.9	2	4.9	1.2
	PB	0	8.9		GND	2.4	3.6	2.4	2.8	0	GND	3.6	0.5	2.2	4.9	2	4.9	1.2
NTSC 4.43	REC	0	8.9		GND	2.4	3.6	1.8-2.6	1.8	0	GND	3	0.5	2.2	4.9	2	4.9	1.2
	PB	0	8.9		GND	2	3.1	1.8-2.6	2.8	0	GND	3.6	0.5	2.2	4.9	2	4.9	1.2

Color system \ Pin No.		㉟	㊱	㊲	㊳	㊴	㊵	㊶	㊷	㊸	㊹	㊺	㊻	㊼	㊽
PAL	REC	GND	1.9	0	0	4.8	0		5			0		0	0
	PB	GND	1.9	0	0	4.8	0		5			0		0	0
SECAM	REC	GND	1.9	0	0	4.8	0		5			0		0	0
	PB	GND	1.9	0	0	4.8	0		5			0		0	0
NTSC 4.43	REC	GND	2	0	0	4.8	0		5			0		0	0
	PB	GND	2	0	0	4.8	0		5			0		0	0

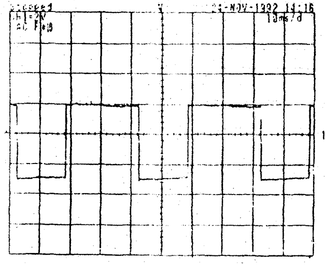

SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
ACE Assembly
Drum Motor
MD-56
(Mechanism Drive)
CP-61
(Canal Plus Jack)
(E5B, CP)
MF-171
(Power/Eject Switch)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144
(Audio)
MF-172
(Mode Control)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)

MA-144 BOARD (1/2) • **See pages 95 and 78 for warveforms (2/2).**

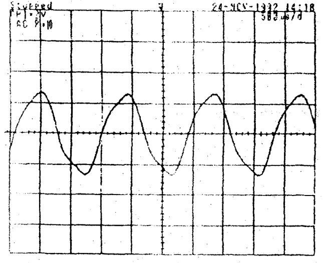
❶ IC203① 2 V/DIV 10 ms/DIV
REC/PB



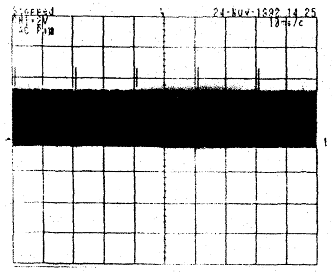
❷ IC203⑦ 2 V/DIV 10 ms/DIV
REC/PB



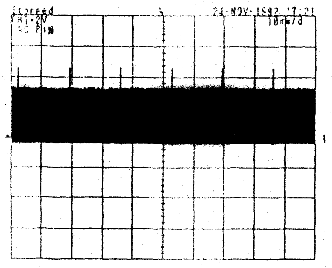
❸ IC203㊷ 2 V/DIV 500 μs/DIV
REC/PB



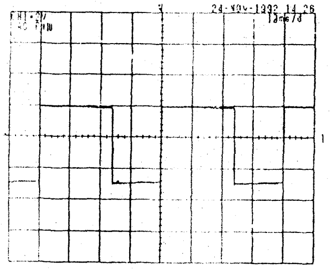
❹ IC203㊅ 2 V/DIV 10 ms/DIV
PAL, SECAM REC/PB



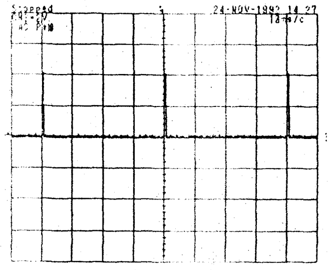
❹ IC203㊅ 2 V/DIV 10 ms/DIV
4.43 REC/PB



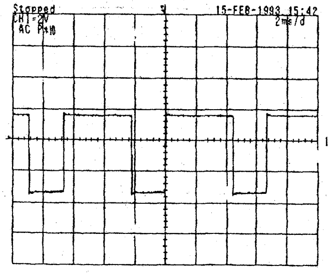
❺ IC203㊆ 2 V/DIV 10 ms/DIV
REC/PB



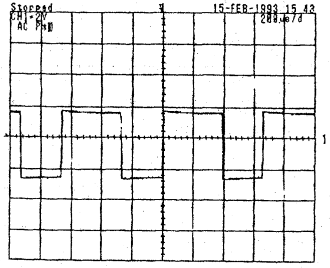
❻ IC203㊇ 2 V/DIV 10 ms/DIV
REC/PB



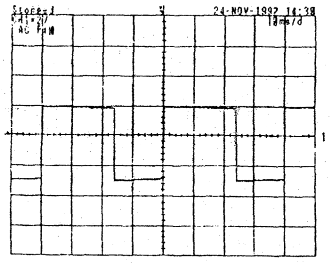
❼ IC203㊈ 2 V/DIV 1 ms/DIV
REC/PB



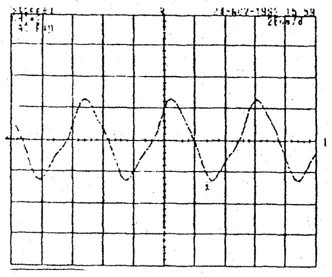
❽ IC203㊉ 2 V/DIV 200 μs/DIV
REC/PB



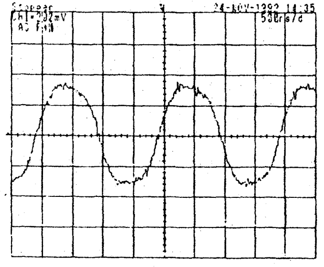
❾ IC203⑰ 2 V/DIV 10 ms/DIV
REC/PB



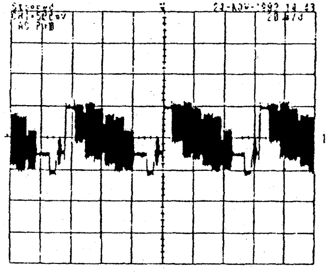
❿ IC301⑨ 2 V/DIV 20 ns/DIV



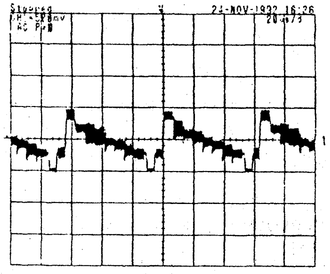
⓫ IC302⑩ 200 mV/DIV 500 ns/DIV
REC/PB



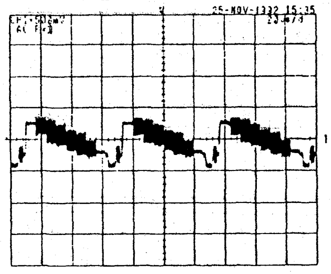
⓬ IC601⑰ 500 mV/DIV 20 μs/DIV
PAL REC/PB



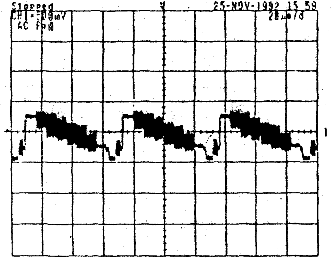
⓬ IC601⑰ 500 mV/DIV 20 μs/DIV
SECAM REC/PB



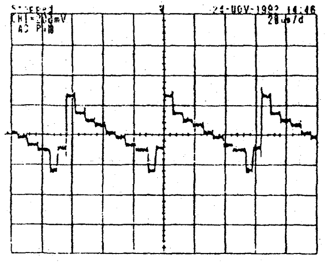
⓬ IC601⑰ 500 mV/DIV 20 μs/DIV
4.43 REC



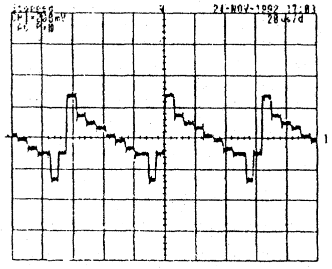
⓬ IC601⑰ 500 mV/DIV 20 μs/DIV
4.43 PB



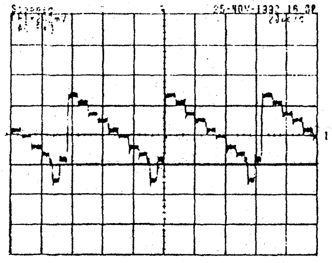
⓭ IC601㉓ 200 mV/DIV 20 μs/DIV
PAL REC/PB, SECAM REC



⓭ IC601㉓ 200 mV/DIV 20 μs/DIV
SECAM PB



⓭ IC601㉓ 200 mV/DIV 20 μs/DIV
4.43 PB



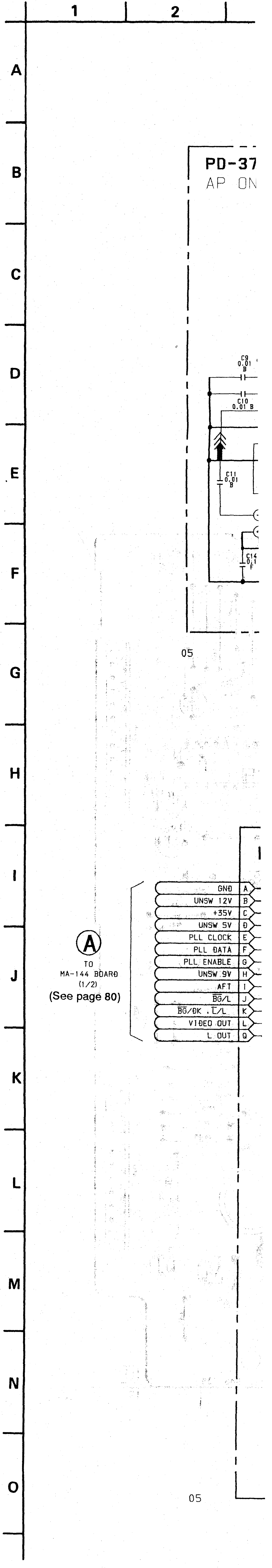
Continued on page 95.

No mark : COMMON (PAL REC)
* : PAL PB
( ) : SECAM REC
(*) : SECAM PB
[ ] : NTSC4.43 REC
[*] : NTSC4.43 PB
# : Impossible to measure the voltage at the marked points.

- Signal path

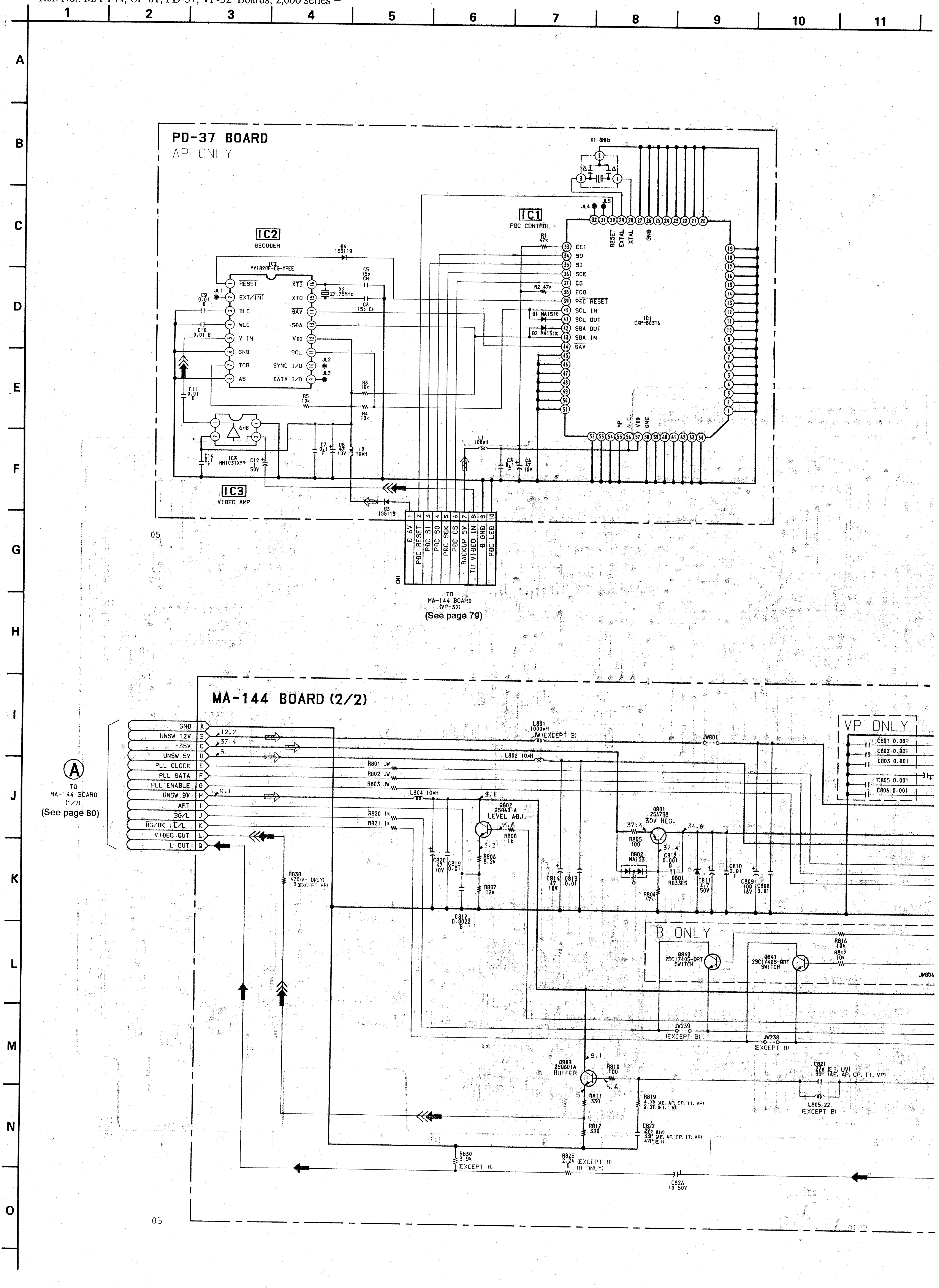
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡≫	➡≫≫	➡
PB	⇨	⇨≫	⇨≫≫	⇨

MA-144 (AUDIO), CP-61 (CANAL I
– Ref. No.: MA-144, CP-61, PD-37, VF


1
2
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
PD-37
AP ON
C9 0.01 B
C10 0.01 B
C11 0.01 B
05
Ⓐ
TO
MA-144 BOARD
(1/2)
(See page 80)
GND A
UNSW 12V B
+35V C
UNSW 5V D
PLL CLOCK E
PLL DATA F
PLL ENABLE G
UNSW 9V H
AFT I
$\overline{\text{BG}}$/L J
$\overline{\text{BG}}$/DK, $\overline{\text{L}}$/L K
VIDEO OUT L
L OUT Q
05

MA-144 (AUDIO) , CP-61 (CANAL PLUS JACK), PD-37 (PDC), VP-32 (VPS) SCHEMATIC DIAGRAM

– Ref. No.: MA-144, CP-61, PD-37, VP-32 Boards; 2,000 series –



1
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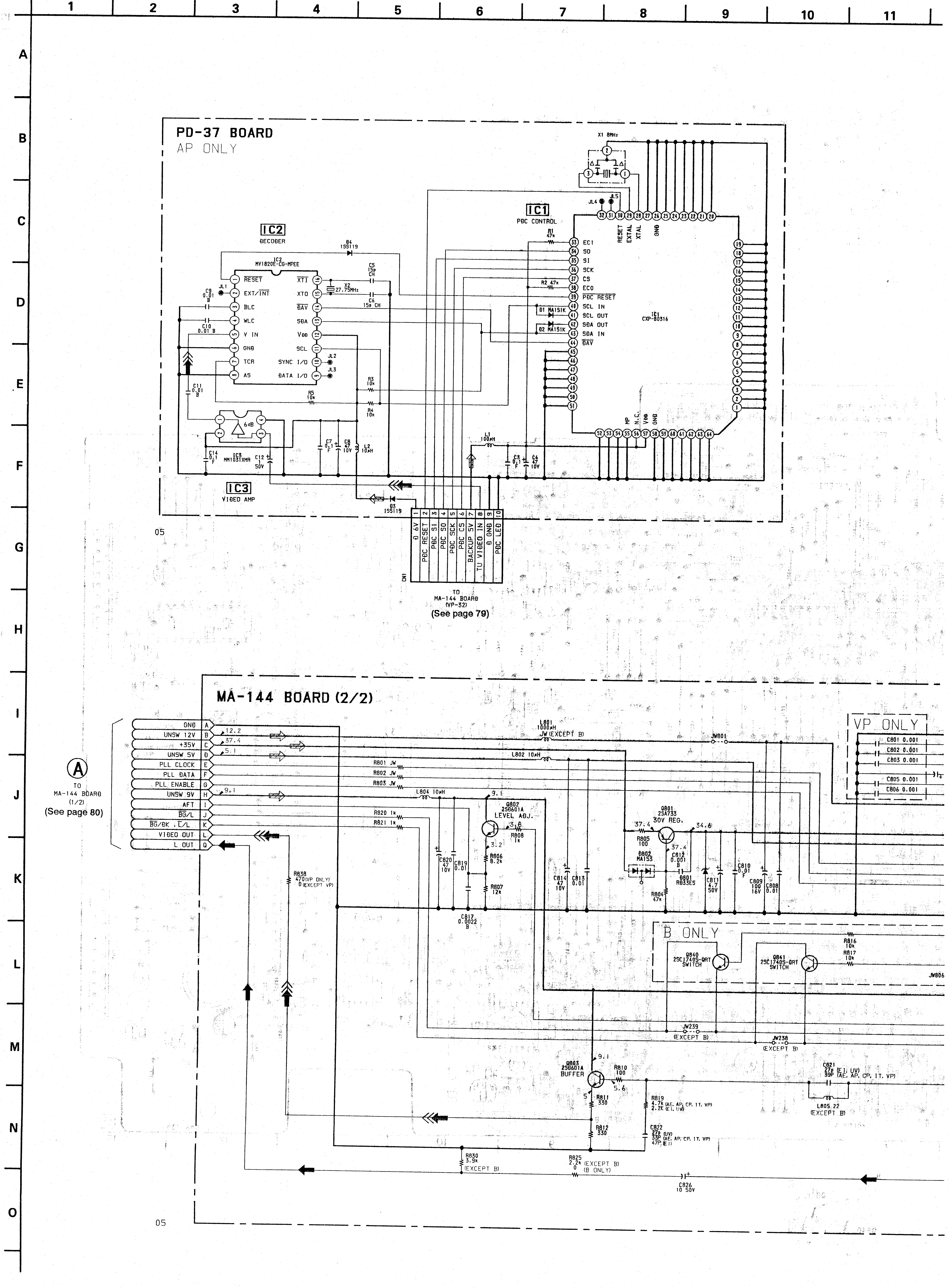
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
PD-37 BOARD
AP ONLY
X1 8MHz
IC1
PDC CONTROL
IC1
CXP-80316
IC2
DECODER
IC2
MV1820E-CG-MPEE
IC3
VIDEO AMP
IC3
MM1031XMR
EC1
SO
SI
SCK
CS
ECO
PDC RESET
SCL IN
SCL OUT
SDA OUT
SDA IN
DAV
RESET
EXTAL
XTAL
GND
RESET
EXT/INT
BLC
WLC
V IN
GND
TCR
AS
XTI
XTO
DAV
SDA
VDD
SCL
SYNC I/O
DATA I/O
X2 27.75MHz
D1 MA151K
D2 MA151K
D3 1SS119
D4 1SS119
L1 100μH
L2 10μH
6dB
CN1
0.6V
PDC RESET
PDC SI
PDC SO
PDC SCK
PDC CS
BACKUP 5V
TU VIDEO IN
D GND
PDC LED
TO MA-144 BOARD (VP-32)
(See page 79)
05
MA-144 BOARD (2/2)
A
TO MA-144 BOARD (1/2)
(See page 80)
GND
UNSW 12V
+35V
UNSW 5V
PLL CLOCK
PLL DATA
PLL ENABLE
UNSW 9V
AFT
BG/L
BG/DK . L/L
VIDEO OUT
L OUT
L801 1000μH JW (EXCEPT B)
L802 10μH
L804 10μH
JW801
VP ONLY
C801 0.001
C802 0.001
C803 0.001
C805 0.001
C806 0.001
Q802 2SD601A LEVEL ADJ.
Q801 2SA733 30V REG.
D802 MA153
D801 RD33ES
R838 470 (VP ONLY) 0 (EXCEPT VP)
B ONLY
Q840 2SC1740S-QRT SWITCH
Q841 2SC1740S-QRT SWITCH
R816 10k
R817 10k
JW806
JW239 (EXCEPT B)
JW238 (EXCEPT B)
Q803 2SD601A BUFFER
R810 100
R811 330
R812 330
R819 4.7k (AE, AP, CP, IT, VP) 2.2k (E1, UV)
C822 27P (UV) 33P (AE, AP, CP, IT, VP) 47P (E1)
C821 27P (E1, UV) 39P (AE, AP, CP, IT, VP)
L805 22 (EXCEPT B)
R830 3.9k (EXCEPT B)
R825 2.2k (EXCEPT B) 0 (B ONLY)
C826 10 50V
05

MA-144 (AUDIO) , CP-61 (CANAL PLUS JACK), PD-37 (PDC), VP-32 (VPS) SCHEMATIC DIAGRAM

– Ref. No.: MA-144, CP-61, PD-37, VP-32 Boards; 2,000 series –


1
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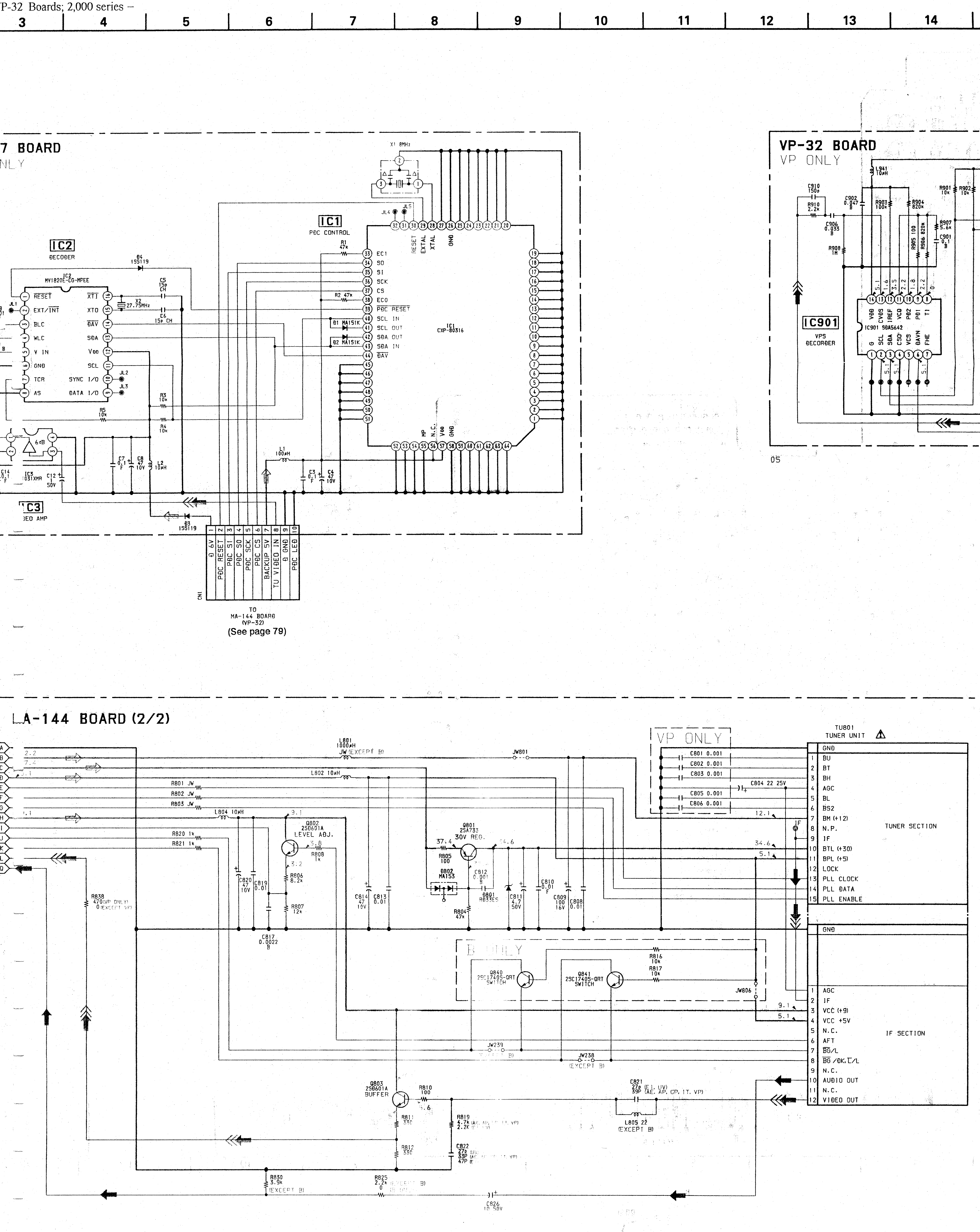
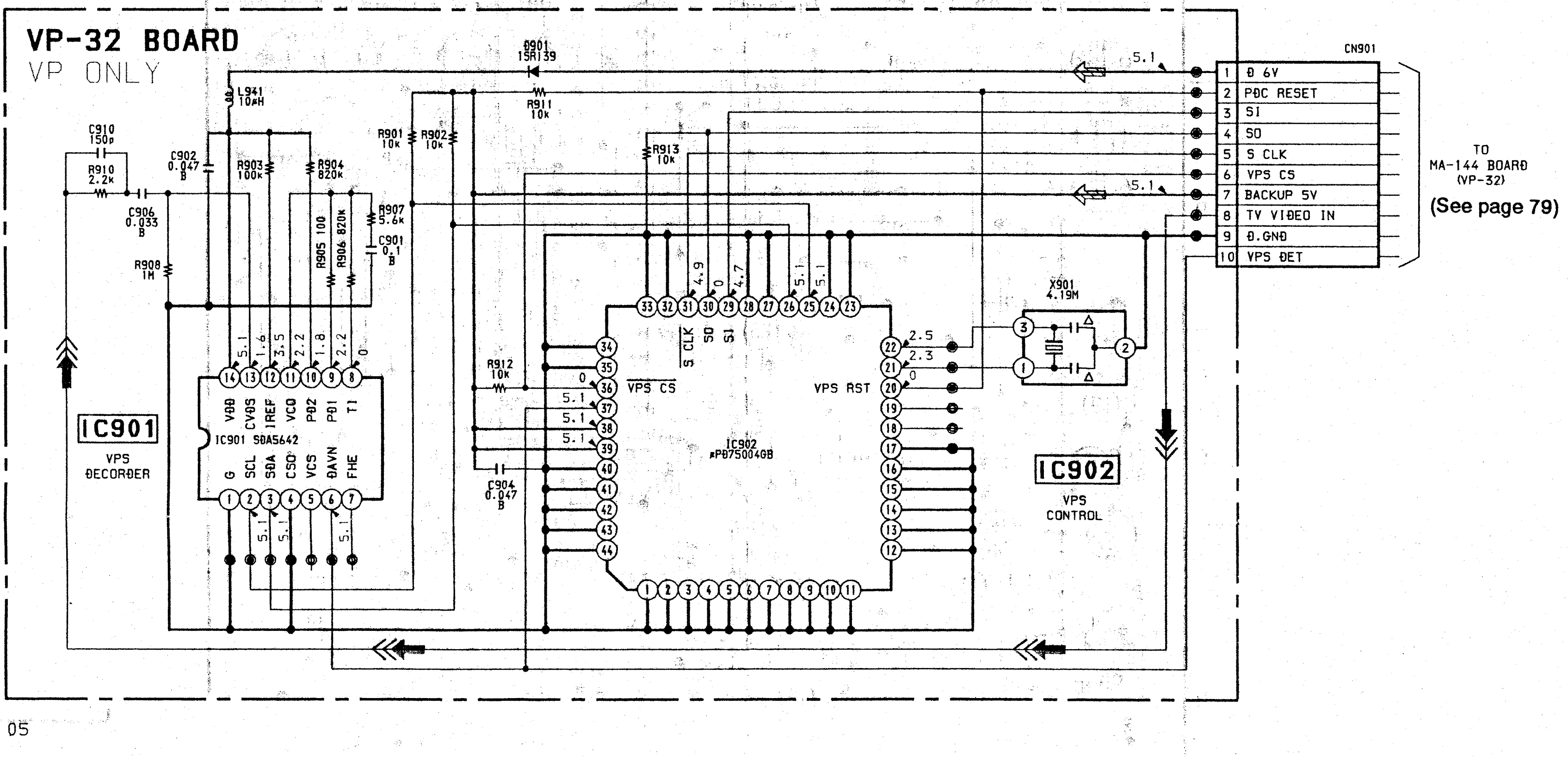
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
PD-37 BOARD
AP ONLY
X1 8MHz
JL4
JL5
IC1
PDC CONTROL
CXP-80316
R1 47k
R2 47k
EC1
SO
SI
SCK
CS
ECO
PDC RESET
SCL IN
SCL OUT
SDA OUT
SDA IN
DAV
RESET
EXTAL
XTAL
GND
MP
N.C.
VDD
D1 MA151K
D2 MA151K
IC2
DECODER
MV1820E-CG-MPEE
D4 1SS119
C5 15p CH
C6 15p CH
X2 27.75MHz
JL1
C9 0.01 B
C10 0.01 B
C11 0.01 B
RESET
EXT/INT
BLC
WLC
V IN
GND
TCR
AS
XTI
XTO
DAV
SDA
VDD
SCL
SYNC I/O
DATA I/O
JL2
JL3
R3 10k
R4 10k
R5 10k
6dB
C14 0.1 F
IC3 MM1031XMR
C12 1 50V
C7 0.1 F
C8 47 10V
L2 10µH
L1 100µH
C3 0.1 F
C4 47 10V
IC3
VIDEO AMP
D3 1SS119
D 6V
PDC RESET
PDC SI
PDC SO
PDC SCK
PDC CS
BACKUP 5V
TU VIDEO IN
D GND
PDC LED
CN1
05
TO MA-144 BOARD (VP-32)
(See page 79)
MA-144 BOARD (2/2)
Ⓐ
TO MA-144 BOARD (1/2)
(See page 80)
GND
UNSW 12V
+35V
UNSW 5V
PLL CLOCK
PLL DATA
PLL ENABLE
UNSW 9V
AFT
BG/L
BG/DK , L/L
VIDEO OUT
L OUT
12.2
37.4
5.1
9.1
L801 1000µH JW (EXCEPT B)
JW801
L802 10µH
R801 JW
R802 JW
R803 JW
L804 10µH
R820 1k
R821 1k
Q802 2SD601A LEVEL ADJ.
3.8
3.2
R808 1k
R806 8.2k
R807 12k
C820 47 10V
C819 0.01
C817 0.0022 B
R838 470 (VP ONLY) 0 (EXCEPT VP)
C814 47 10V
C813 0.01
Q801 2SA733 30V REG.
37.4
34.6
R805 100
D802 MA153
C812 0.001 B
D801 RD33ES
R804 47k
C811 4.7 50V
C810 0.01 F
C809 100 16V
C808 0.01
VP ONLY
C801 0.001
C802 0.001
C803 0.001
C805 0.001
C806 0.001
B ONLY
Q840 2SC1740S-QRT SWITCH
Q841 2SC1740S-QRT SWITCH
R816 10k
R817 10k
JW806
JW239 (EXCEPT B)
JW238 (EXCEPT B)
Q803 2SD601A BUFFER
9.1
5
5.6
R810 100
R811 330
R812 330
R819 4.7k (AE, AP, CP, IT, VP) 2.2K (EI, UV)
C822 27p (UV) 33P (AE, AP, CP, IT, VP) 47P (EI)
C821 27p (EI, UV) 39P (AE, AP, CP, IT, VP)
L805 22 (EXCEPT B)
R830 3.9k (EXCEPT B)
R825 2.2k (EXCEPT B) 0 (B ONLY)
C826 10 50V
05

PLUS JACK), PD-37 (PDC), VP-32 (VPS) SCHEMATIC DIAGRAM

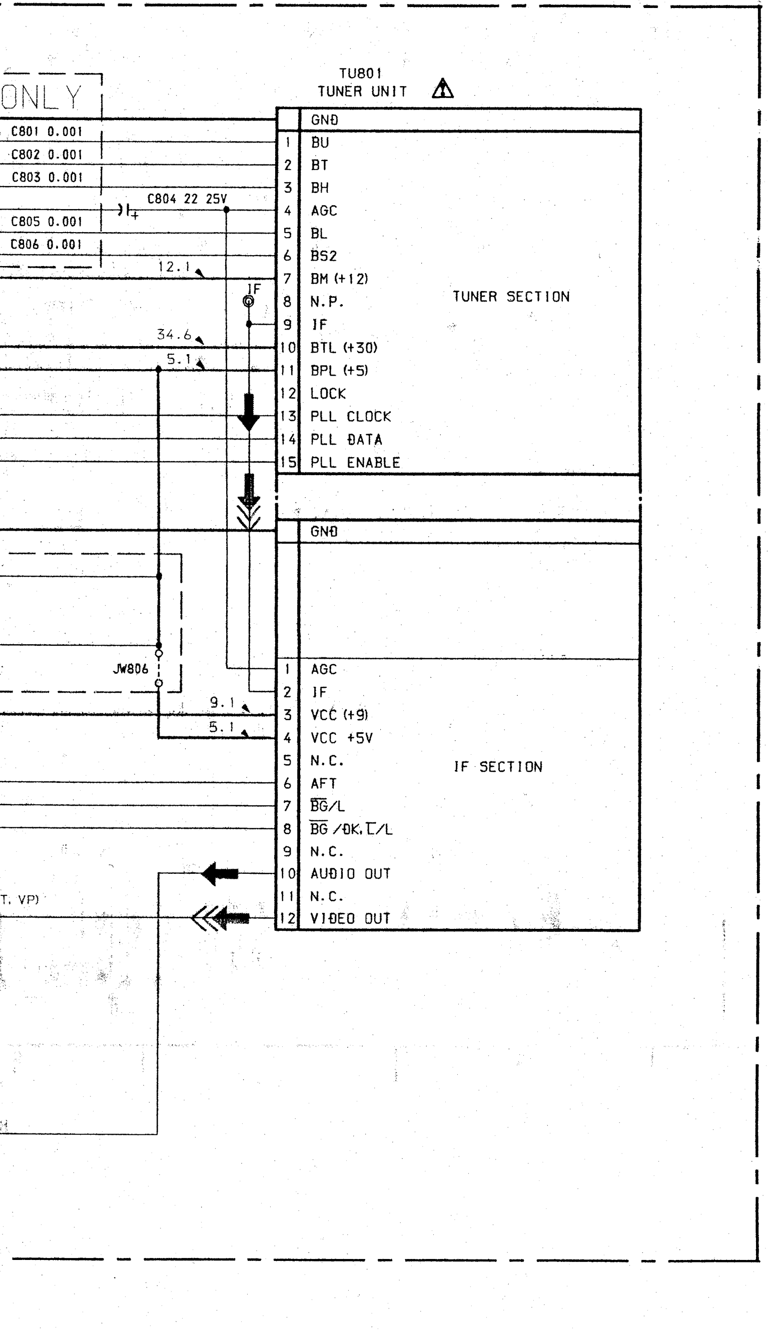
P-32 Boards; 2,000 series –

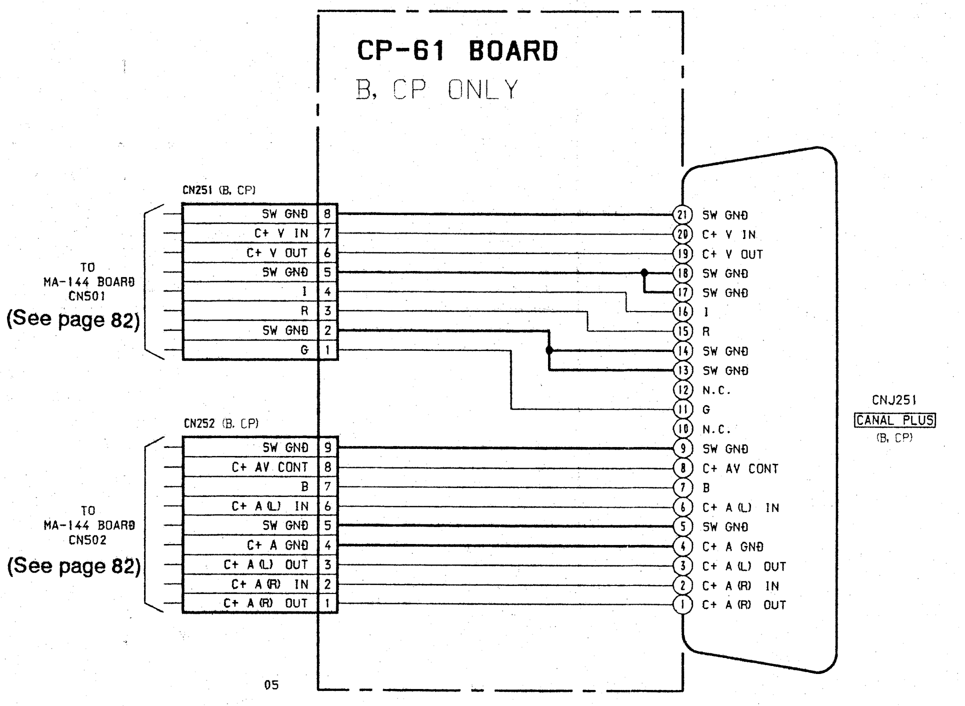


3
4
5
6
7
8
9
10
11
12
13
14
7 BOARD
NLY
IC2
DECODER
IC2 MV1820E-CG-MPEE
RESET
EXT/INT
BLC
WLC
V IN
GND
TCR
AS
XTI
XTO
DAV
SDA
VDD
SCL
SYNC I/O
DATA I/O
X2 27.75MHz
D4 1SS119
IC3 VIDEO AMP
IC1
PDC CONTROL
IC1 CXP-80316
X1 8MHz
EC1
SO
SI
SCK
CS
ECO
PDC RESET
SCL IN
SCL OUT
SDA OUT
SDA IN
DAV
RESET
EXTAL
XTAL
GND
D1 MA151K
D2 MA151K
L1 100μH
D3 1SS119
CN1
Ð 6V
PDC RESET
PDC SI
PDC SO
PDC SCK
PDC CS
BACKUP 5V
TU VIDEO IN
Ð GND
PDC LED
TO MA-144 BOARD (VP-32)
(See page 79)
VP-32 BOARD
VP ONLY
IC901
VPS DECORDER
IC901 SDA5642
L941 10μH
MA-144 BOARD (2/2)
L801 1000μH JW (EXCEPT B)
L802 10μH
L804 10μH
R801 JW
R802 JW
R803 JW
R820 1k
R821 1k
Q802 2SD601A LEVEL ADJ.
Q801 2SA733 30V REG.
D802 MA153
D801 RD33ES
JW801
VP ONLY
C801 0.001
C802 0.001
C803 0.001
C804 22 25V
C805 0.001
C806 0.001
B ONLY
Q840 2SC1740S-QRT SWITCH
Q841 2SC1740S-QRT SWITCH
JW806
JW239
JW238 (EXCEPT B)
Q803 2SD601A BUFFER
R810 100
C821 27p (EJ, UV) 39P (AE, AP, CP, IT, VP)
L805 22 (EXCEPT B)
R830 3.9k (EXCEPT B)
R825 2.2k (EXCEPT B)
C826 10 50V
TU801 TUNER UNIT
GND
BU
BT
BH
AGC
BL
BS2
BM (+12)
N.P.
IF
BTL (+30)
BPL (+5)
LOCK
PLL CLOCK
PLL DATA
PLL ENABLE
TUNER SECTION
GND
AGC
IF
VCC (+9)
VCC +5V
N.C.
AFT
BG/L
BG/DK, I/L
N.C.
AUDIO OUT
N.C.
VIDEO OUT
IF SECTION


1
12
13
14
15
16
17
18
19
20
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
VP-32 BOARD
VP ONLY
D901
1SR139
R911
10k
L941
10µH
C910
150p
R910
2.2k
C906
0.033
B
C902
0.047
B
R903
100k
R904
820k
R905 100
R906 820k
R907
5.6k
C901
0.1
B
R908
1M
R901
10k
R902
10k
R913
10k
R912
10k
C904
0.047
B
IC901
VPS
DECORDER
IC901 SDA5642
VDD
CVDS
IREF
VCO
PD2
PD1
TI
G
SCL
SDA
CSO
VCS
DAVN
FHE
5.1
1.6
3.5
2.2
1.8
2.2
0
IC902
µPD75004GB
IC902
VPS
CONTROL
S CLK
SO
SI
VPS CS
VPS RST
4.9
0
4.7
5.1
2.5
2.3
X901
4.19M
CN901
1 D 6V
2 PDC RESET
3 SI
4 SO
5 S CLK
6 VPS CS
7 BACKUP 5V
8 TV VIDEO IN
9 D.GND
10 VPS DET
TO
MA-144 BOARD
(VP-32)
05

(See page 79)


ONLY
C801 0.001
C802 0.001
C803 0.001
C804 22 25V
C805 0.001
C806 0.001
12.1
34.6
5.1
9.1
IF
JW806
T. VP)
TU801
TUNER UNIT
GND
1 BU
2 BT
3 BH
4 AGC
5 BL
6 BS2
7 BM (+12)
8 N.P.
9 IF
10 BTL (+30)
11 BPL (+5)
12 LOCK
13 PLL CLOCK
14 PLL DATA
15 PLL ENABLE
TUNER SECTION
GND
1 AGC
2 IF
3 VCC (+9)
4 VCC +5V
5 N.C.
6 AFT
7 BG/L
8 BG /DK.L/L
9 N.C.
10 AUDIO OUT
11 N.C.
12 VIDEO OUT
IF SECTION


CP-61 BOARD
B, CP ONLY
CN251 (B, CP)
SW GND 8
C+ V IN 7
C+ V OUT 6
SW GND 5
I 4
R 3
SW GND 2
G 1
TO
MA-144 BOARD
CN501
CN252 (B, CP)
SW GND 9
C+ AV CONT 8
B 7
C+ A (L) IN 6
SW GND 5
C+ A GND 4
C+ A (L) OUT 3
C+ A (R) IN 2
C+ A (R) OUT 1
TO
MA-144 BOARD
CN502
21 SW GND
20 C+ V IN
19 C+ V OUT
18 SW GND
17 SW GND
16 I
15 R
14 SW GND
13 SW GND
12 N.C.
11 G
10 N.C.
9 SW GND
8 C+ AV CONT
7 B
6 C+ A (L) IN
5 SW GND
4 C+ A GND
3 C+ A (L) OUT
2 C+ A (R) IN
1 C+ A (R) OUT
CNJ251
CANAL PLUS
(B, CP)
05

(See page 82)

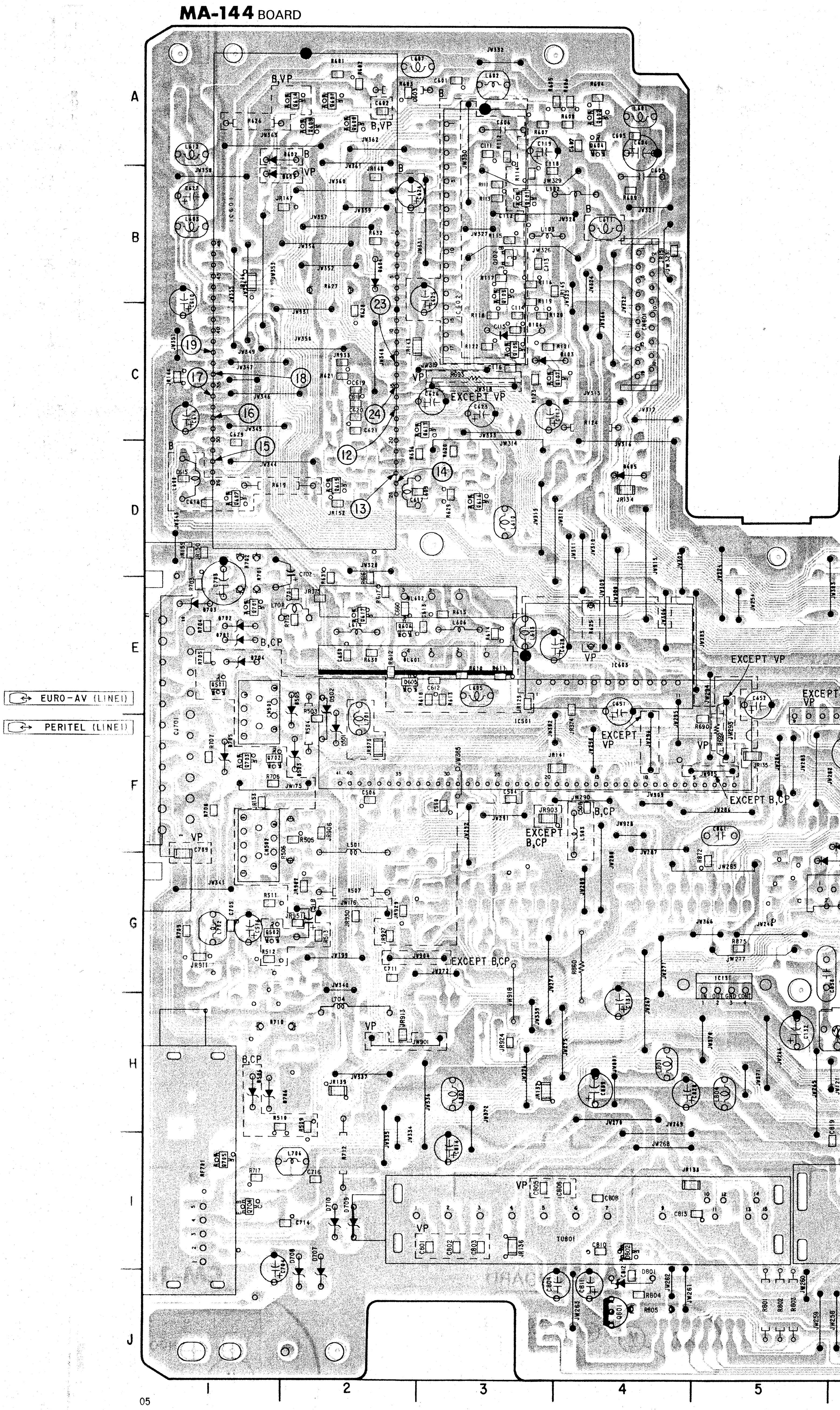
(See page 82)

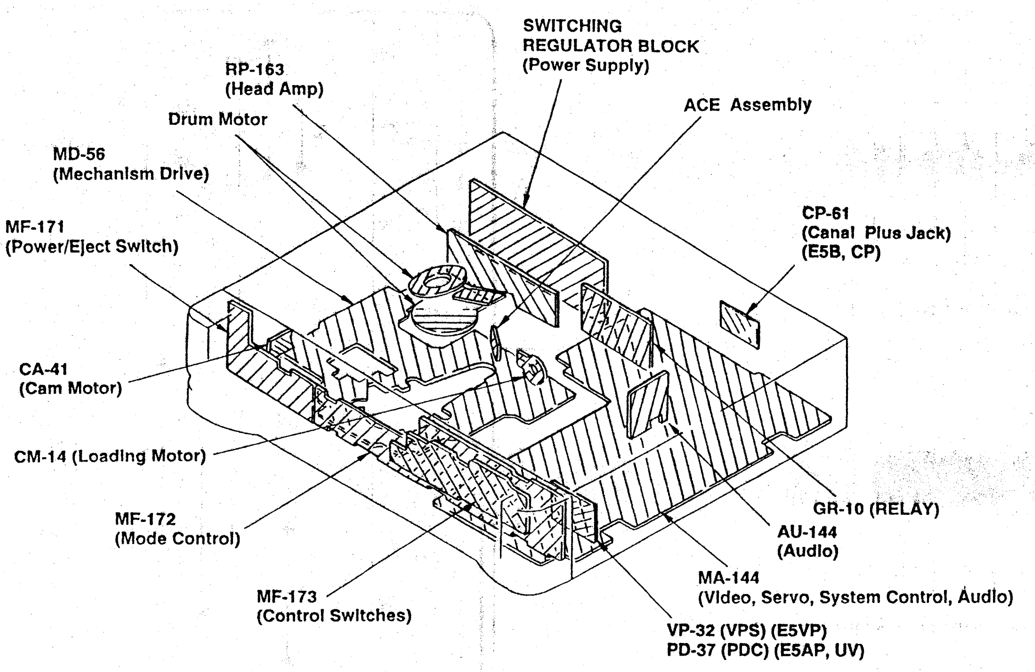
MA-144 (TUNER), CP-61(CANAL PLUS JACK), PD-37 (PDC), VP-32 (VPS) PRINTED WIRING BOARDS

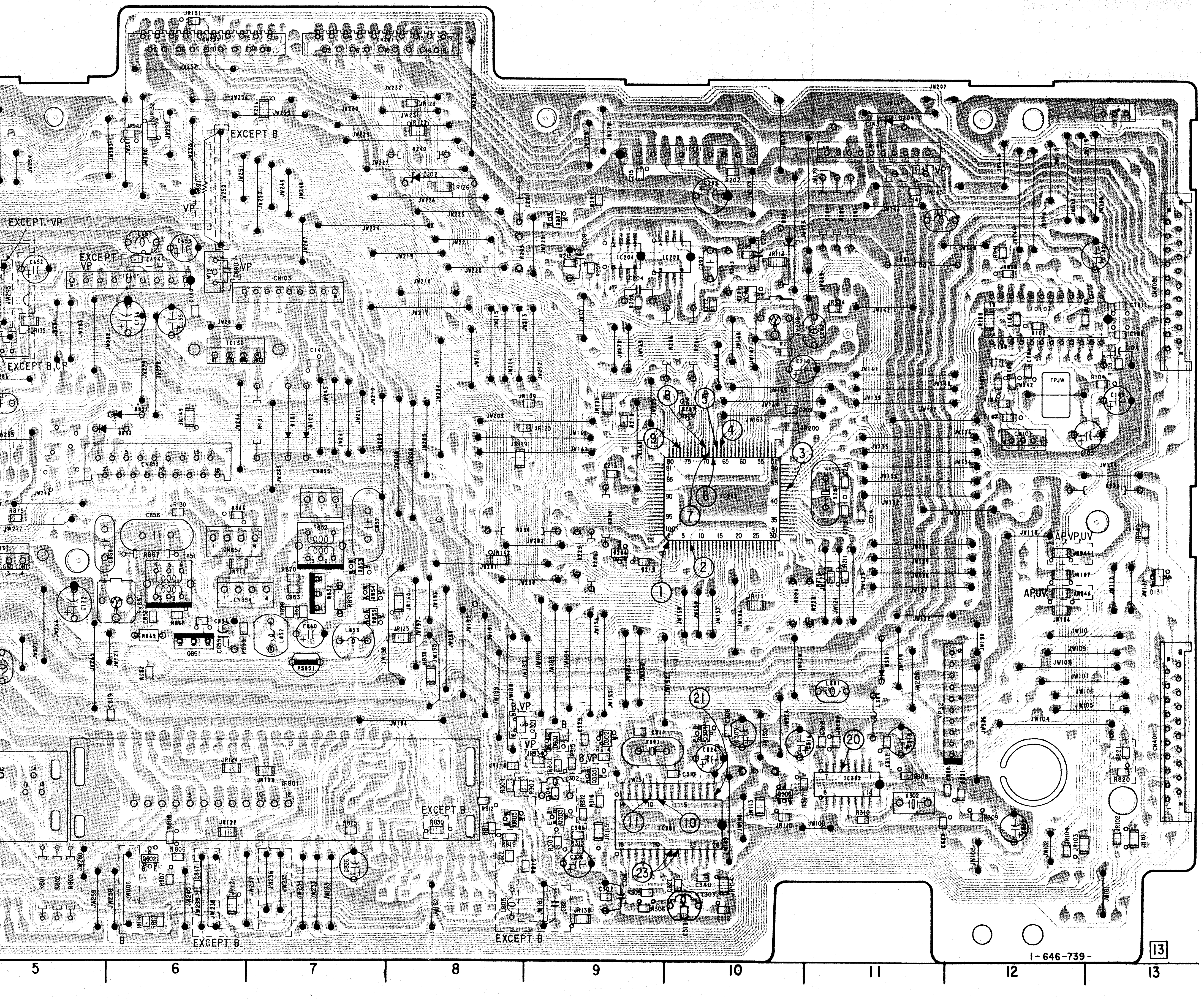
– Ref. No.: MA-144, CP-61, PD-37, VP-32 Boards; 2,000 series –

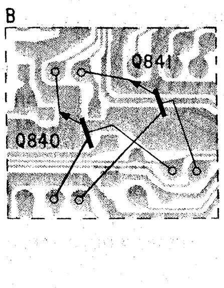
MA-144 BOARD

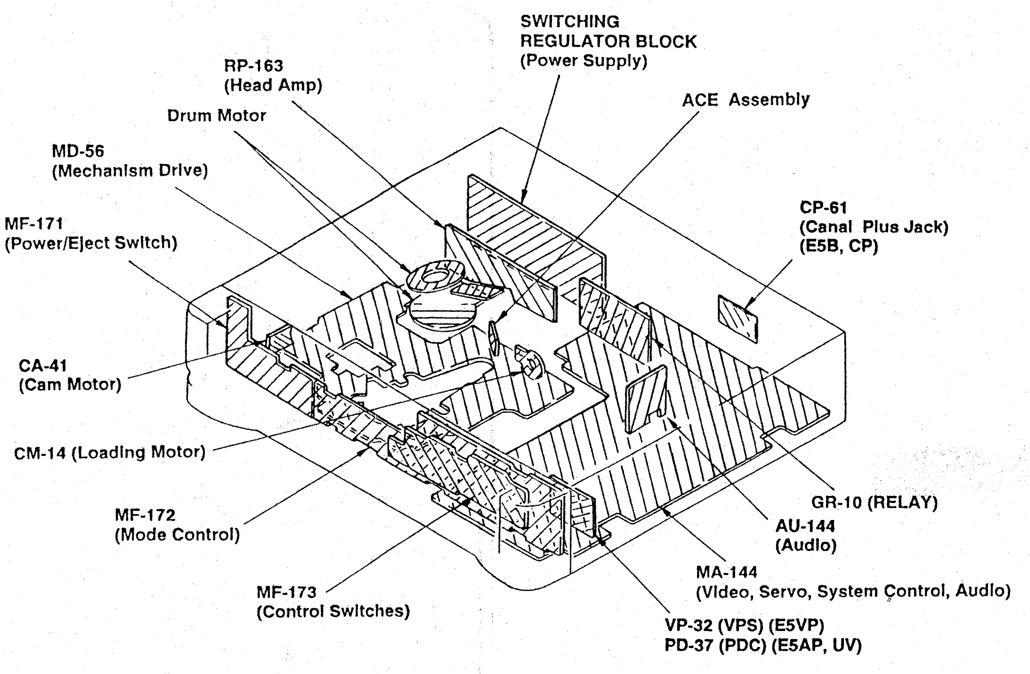
CN032	
CN101	G-12
CN103	F-7
CN104	E-14
CN201	D-7
CN202	D-6
CN401	H-13
CN402	E-13
CN501	E-1
CN502	F-1
CN601	B-4
CN853	G-6
CN854	H-6
CN855	G-7
CN857	G-6
D101	G-7
D102	G-7
D103	C-3
D104	C-3
D131	H-13
D201	F-10
D202	E-8
D203	E-10
D204	D-11
D206	G-9
D207	F-10
D301	H-11
D302	I-9
D501	F-2
D502	E-2
D503	F-2
D505	E-2
D506	H-1
D601	I-9
D602	A-1
D603	B-1
D604	B-2
D605	D-4
D701	E-1
D702	E-1
D703	E-1
D704	E-1
D705	F-1
D706	H-1
D707	I-2
D708	I-2
D709	I-2
D710	I-2
D801	J-4
D802	I-4
D851	F-6
D852	G-5
D853	G-5
D854	G-5
IC101	F-12
IC131	G-5
IC132	F-6
IC201	E-9
IC202	E-10
IC203	G-10
IC204	E-9
IC301	I-9
IC302	I-11
IC501	F-3
IC601	A-1
IC602	B-3
IC603	E-4
IC605	E-6
Q101	B-3
Q102	B-3
Q103	B-3
Q105	C-3
Q107	C-3
Q201	E-9
Q301	I-8
Q303	I-9
Q304	I-10
Q305	I-9
Q306	I-10
Q501	E-1
Q502	G-1
Q503	G-1
Q601	A-2
Q602	A-4
Q603	A-3
Q604	A-4
Q605	E-2
Q606	E-2
Q607	D-1
Q608	A-2
Q609	A-2
Q613	C-3
Q614	A-2
Q615	D-2
Q616	D-3
Q617	E-2
Q701	E-1
Q702	F-1
Q703	F-1
Q704	I-1
Q705	I-1
Q801	J-4
Q803	I-8
Q851	H-6
Q852	H-7
Q853	H-7
Q854	H-7
Q855	H-7
Q856	G-5

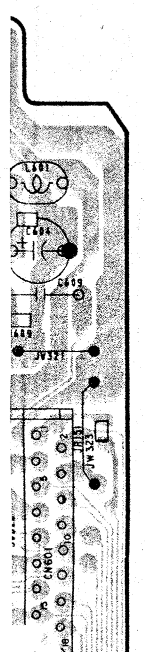

MA-144 BOARD
A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
05
EURO-AV (LINE1)
PERITEL (LINE1)
B,VP
B
VP
EXCEPT VP
EXCEPT B,CP
EXCEPT B,CP
B,CP
VP
IC601
IC603
IC501
IC131
IN OUT GND CONT
TU801
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(23)
(24)

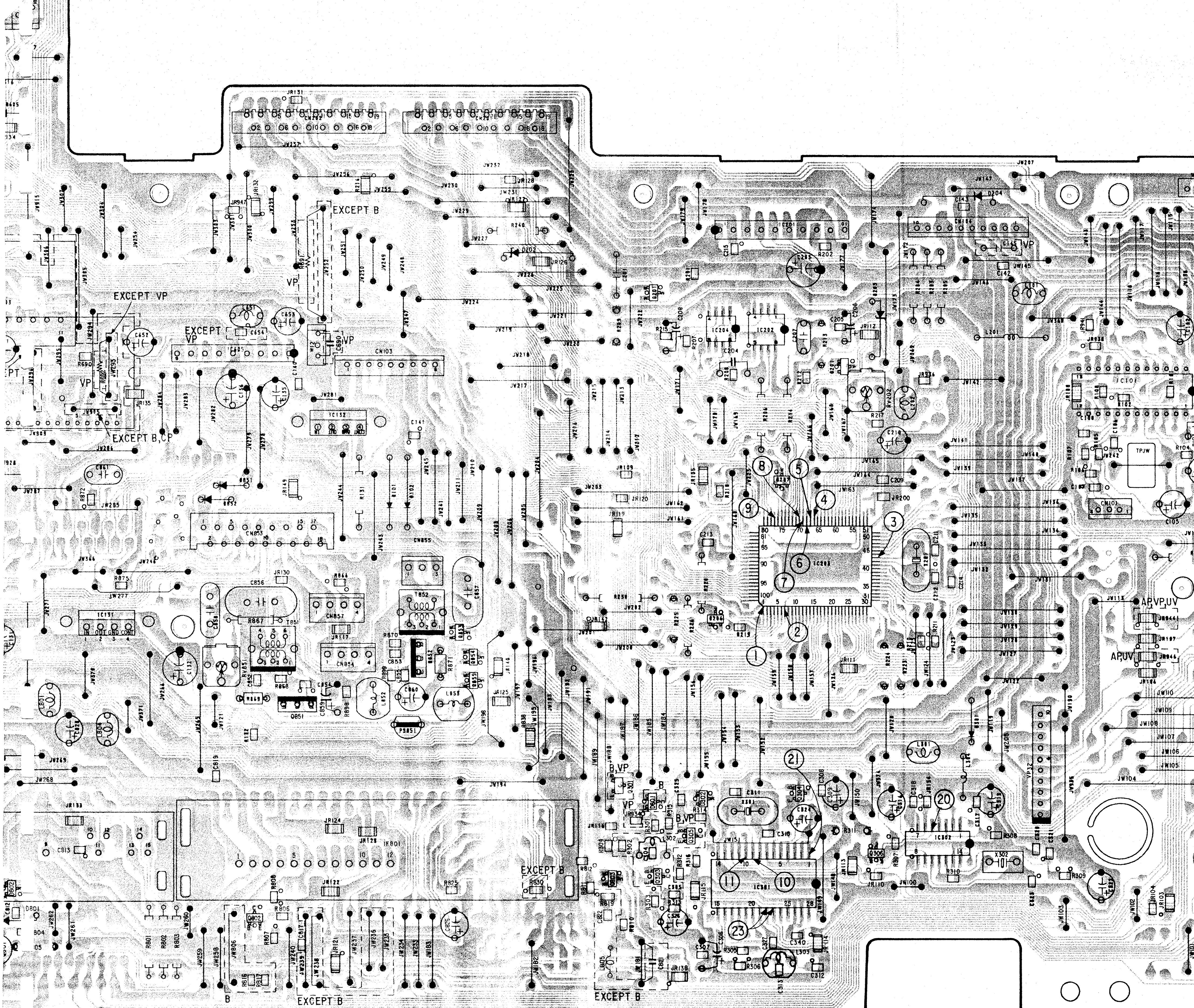

SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
ACE Assembly
Drum Motor
MD-56
(Mechanism Drive)
CP-61
(Canal Plus Jack)
(E5B, CP)
MF-171
(Power/Eject Switch)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
MF-172
(Mode Control)
AU-144
(Audio)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)


EXCEPT B
EXCEPT VP
EXCEPT VP
VP
EXCEPT B,CP
CN103
CN853
CN855
CN854
CN857
T852
IC152
IC203
IC204
IC202
IC101
CN102
CN401
IC302
IC301
IF801
VP32
TPJW
AP,VP,UV
AP,UV
EXCEPT B
EXCEPT B
EXCEPT B
B
B,VP
1
2
3
4
5
6
7
8
9
10
11
20
21
23
5
6
7
8
9
10
11
12
13
1-646-739-
13


B
Q841
Q840


SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
ACE Assembly
Drum Motor
MD-56
(Mechanism Drive)
CP-61
(Canal Plus Jack)
(E5B, CP)
MF-171
(Power/Eject Switch)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144
(Audio)
MF-172
(Mode Control)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)




EXCEPT VP
EXCEPT VP
EXCEPT B
VP
VP
EXCEPT B,CP
CN103
CN853
CN855
CN857
CN854
IC131
IC132
IC151
IC204
IC202
IC203
IC101
IC301
IC302
IC801
Q851
PS851
T851
T852
X301
X302
TPJW
AP,VP,UV
AP,UV
B,VP
B
VP
EXCEPT B
EXCEPT B
EXCEPT B
B
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑳ ㉑ ㉓
1-646-739-
4
5
6
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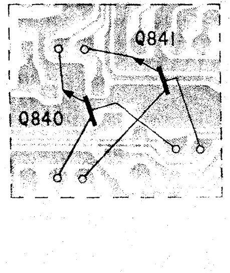
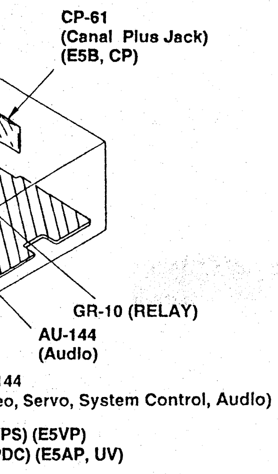
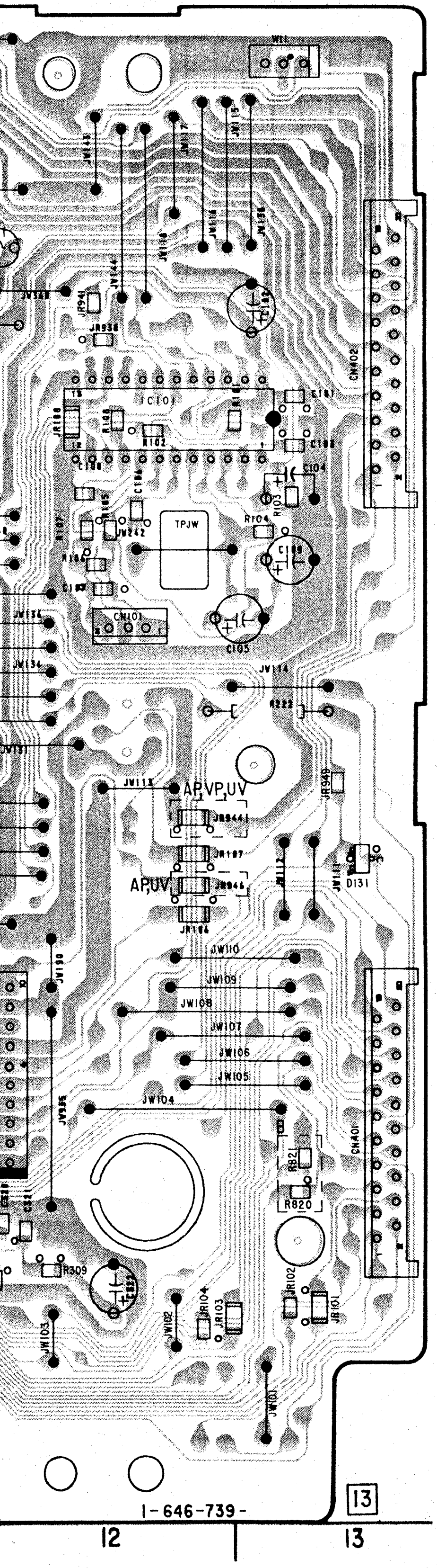
10
11
12

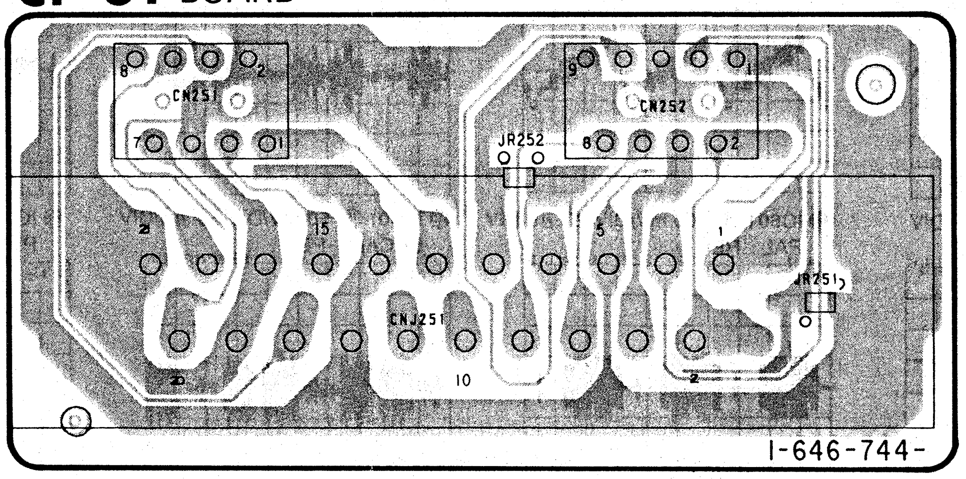

B
Q841
Q840

Assembly


CP-61
(Canal Plus Jack)
(E5B, CP)
GR-10 (RELAY)
AU-144
(Audio)
44
eo, Servo, System Control, Audio)
PS) (E5VP)
DC) (E5AP, UV)


CN402
CN401
TPJW
AP,VP,UV
AP,UV
D131
1-646-739-
13
12
13

CP-61 BOARD

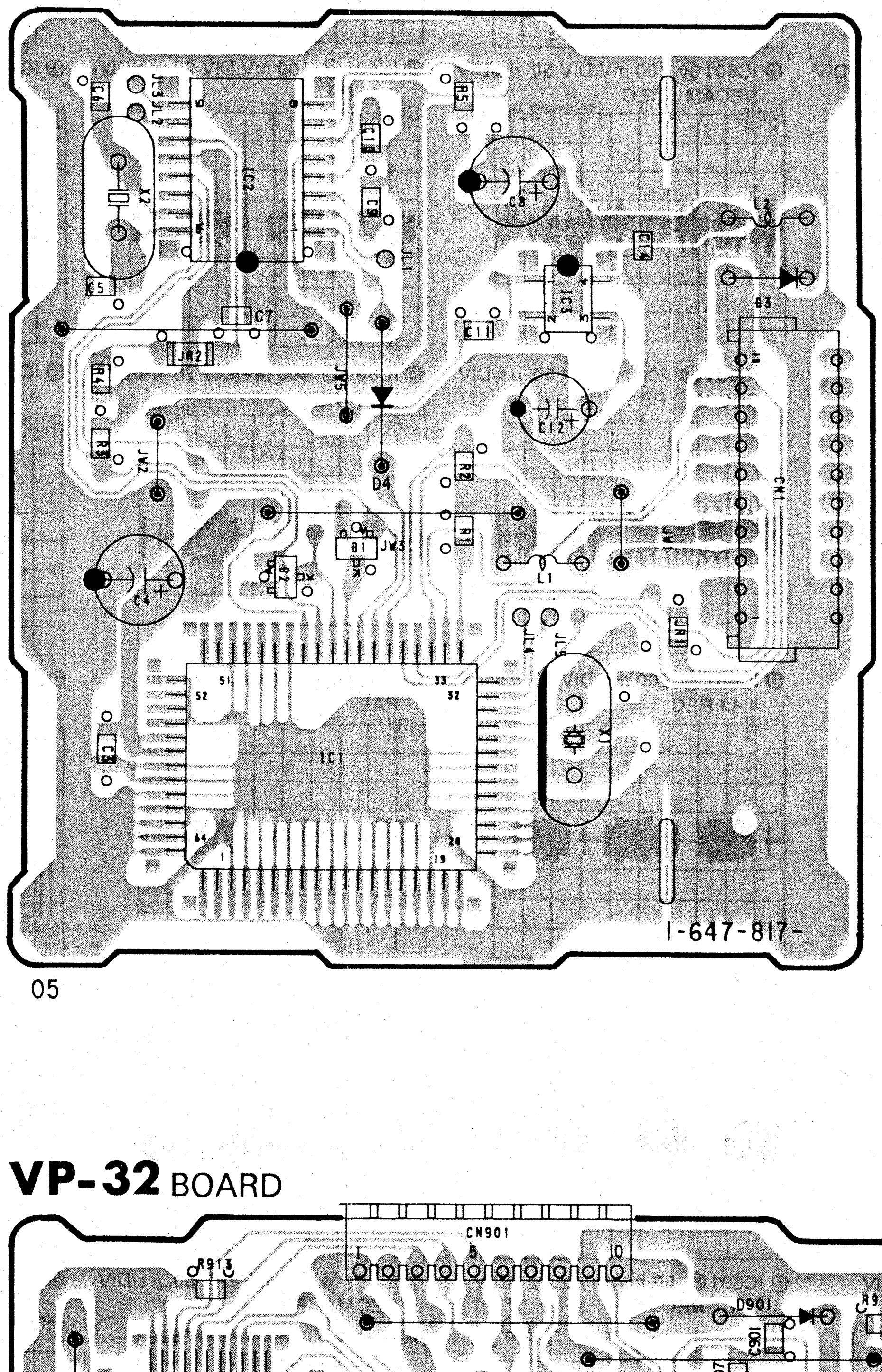

CN251
CN252
JR252
CNJ251
JR251
1-646-744-
13
22

05

CANAL PLUS

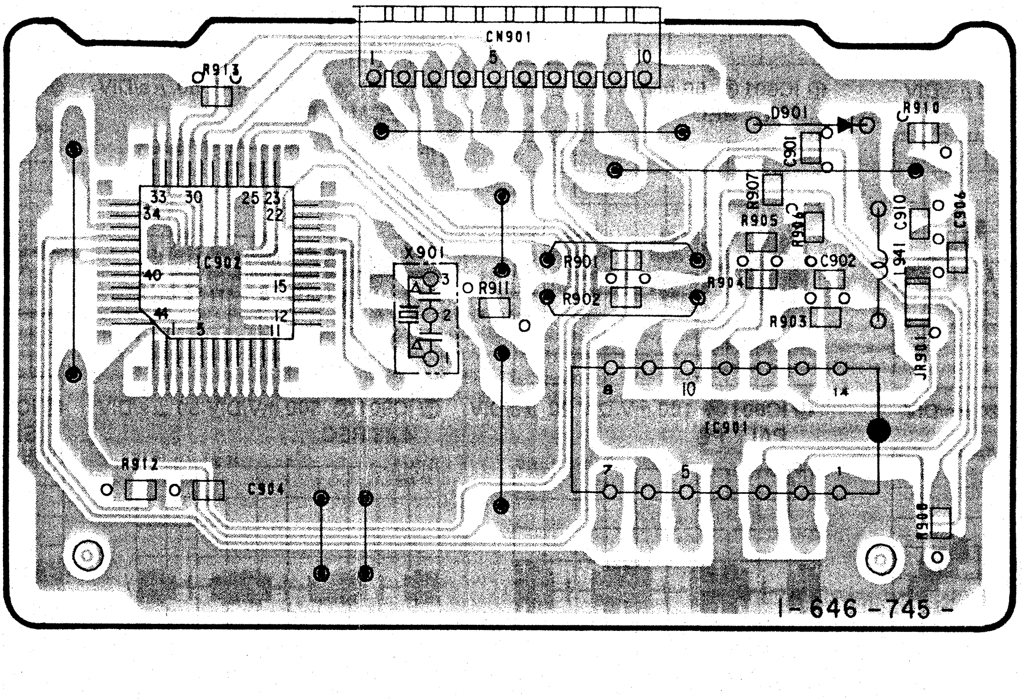
CANAL +

PD-37 BOARD


IC2
IC1
IC3
CN1
X1
X2
D3
D4
L1
L2
1-647-817-
11

05

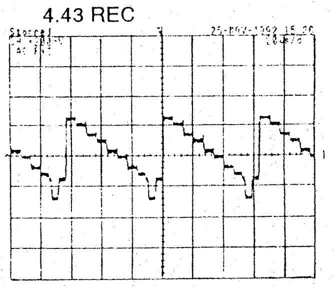
VP-32 BOARD


CN901
IC902
IC901
X901
D901
1-646-745-
13
22

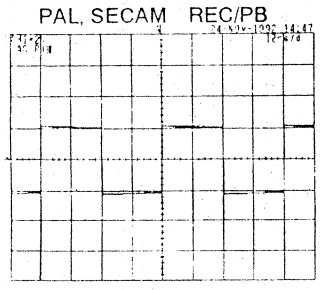
• Continued from page 87.

MA-144 BOARD (2/2)

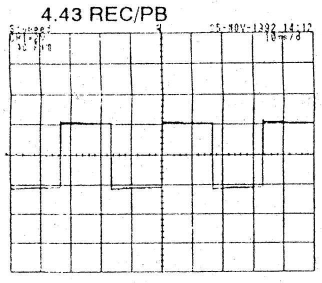
⓭ IC601 ㉓ 200 mV/DIV 20 μs/DIV
4.43 REC



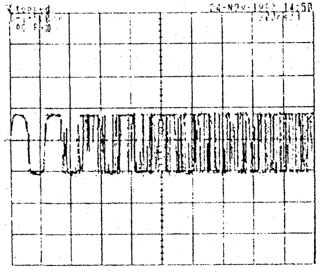
⓮ IC601 ㉔ 2 V/DIV 10 ms/DIV
PAL, SECAM REC/PB



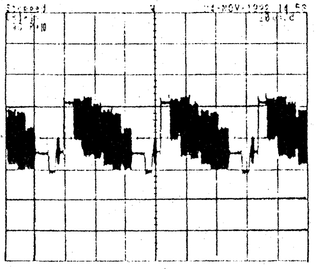
⓮ IC601 ㉔ 2 V/DIV 10 ms/DIV
4.43 REC/PB



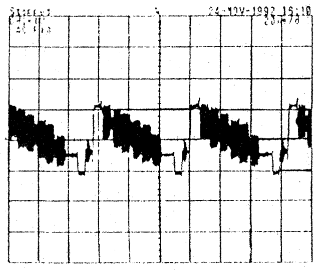
⓯ IC601 ㉘ 500 mV/DIV 200 ns/DIV
REC



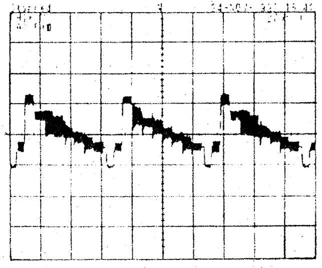
⓰ IC601 ㉜ 1 V/DIV 20 μs/DIV
PAL REC



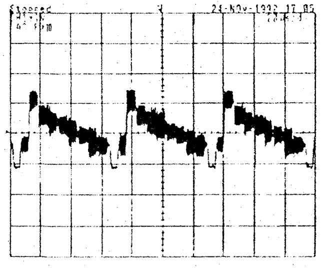
⓰ IC601 ㉜ 1 V/DIV 20 μs/DIV
PAL PB



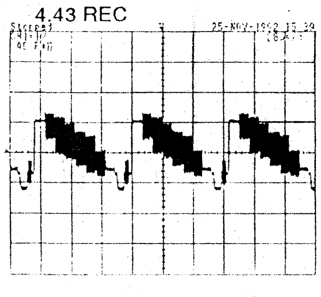
⓰ IC601 ㉜ 1 V/DIV 20 μs/DIV
SECAM REC



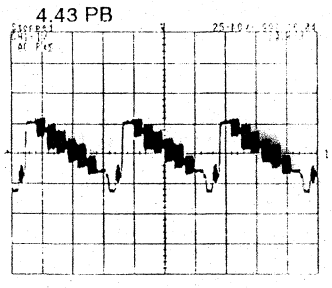
⓰ IC601 ㉜ 1 V/DIV 20 μs/DIV
SECAM PB



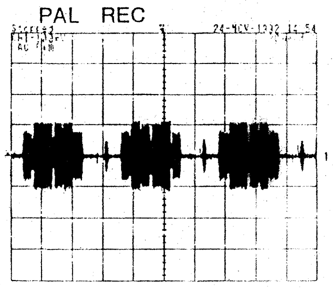
⓰ IC601 ㉜ 1 V/DIV 20 μs/DIV
4.43 REC



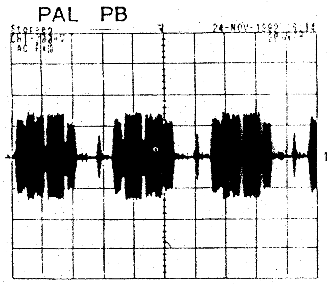
⓰ IC601 ㉜ 1 V/DIV 20 μs/DIV
4.43 PB



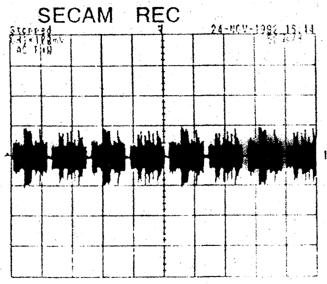
⓱ IC601 ㉞ 100 mV/DIV 20 μs/DIV
PAL REC



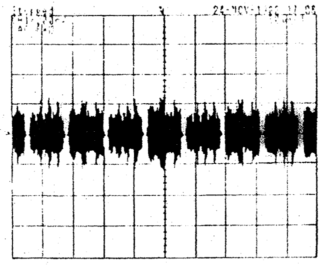
⓱ IC601 ㉞ 200 mV/DIV 20 μs/DIV
PAL PB



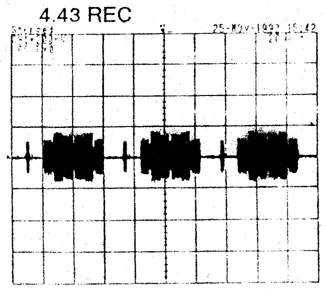
⓱ IC601 ㉞ 100 mV/DIV 50 μs/DIV
SECAM REC



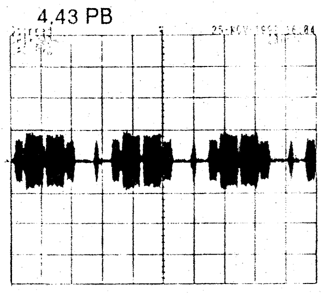
⓱ IC601 ㉞ 200 mV/DIV 50 μs/DIV
SECAM PB



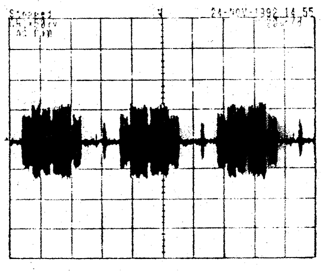
⓱ IC601 ㉞ 200 mV/DIV 20 μs/DIV
4.43 REC



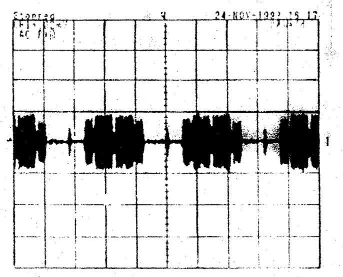
⓱ IC601 ㉞ 200 mV/DIV 20 μs/DIV
4.43 PB



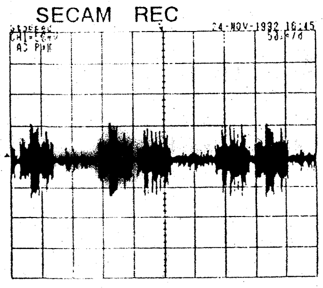
⓲ IC601 ㊱ 50 mV/DIV 20 μs/DIV
PAL REC



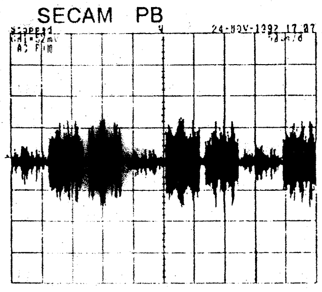
⓲ IC601 ㊱ 100 mV/DIV 20 μs/DIV
PAL PB



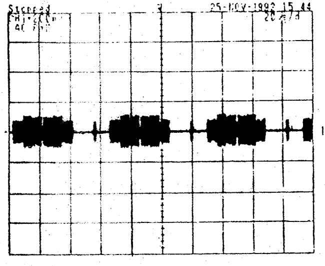
⓲ IC601 ㊱ 50 mV/DIV 50 μs/DIV
SECAM REC



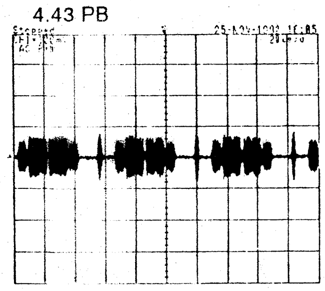
⓲ IC601 ㊱ 50 mV/DIV 50 μs/DIV
SECAM PB



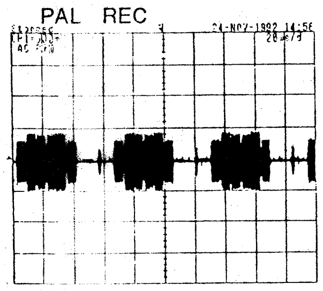
⓲ IC601 ㊱ 200 mV/DIV 20 μs/DIV
4.43 REC



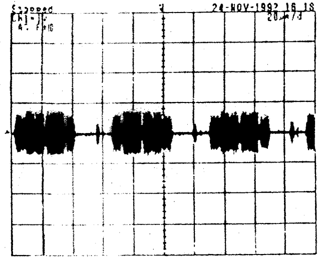
⓲ IC601 ㊱ 100 mV/DIV 20 μs/DIV
4.43 PB



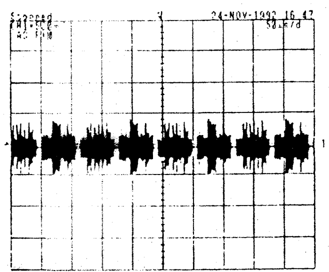
⓳ IC601 ㊳ 500 mV/DIV 20 μs/DIV
PAL REC



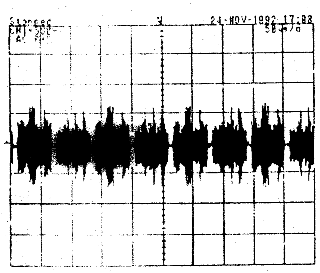
⓳ IC601 ㊳ 1 V/DIV 20 μs/DIV
PAL PB



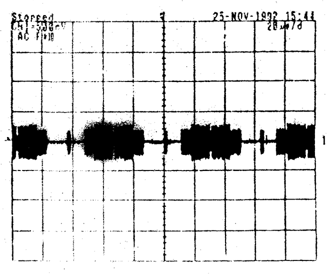
⓳ IC601 ㊳ 500 mV/DIV 50 μs/DIV
SECAM REC



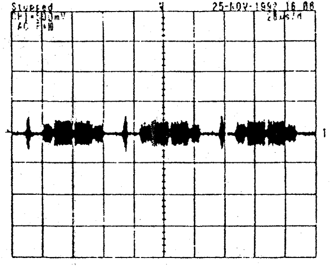
⓳ IC601 ㊳ 500 mV/DIV 50 μs/DIV
SECAM PB



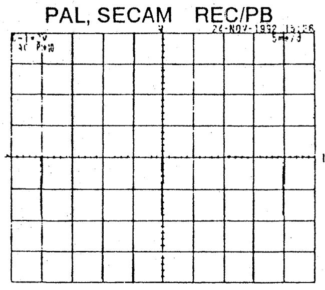
⓳ IC601 ㊳ 500 mV/DIV 50 μs/DIV
4.43 REC



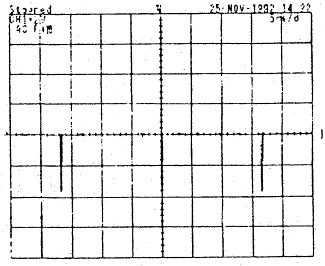
⓳ IC601 ㊳ 500 mV/DIV 20 μs/DIV
4.43 PB



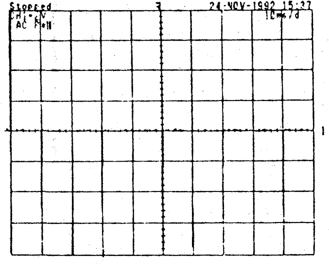
⓴ IC302 ⑤ 2 V/DIV 5 ms/DIV
PAL, SECAM REC/PB



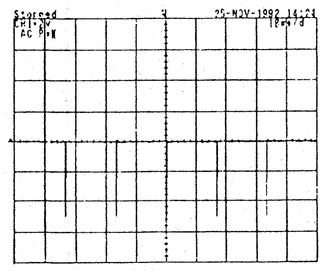
⓴ IC302 ⑤ 2 V/DIV 5 ms/DIV
4.43 REC/PB



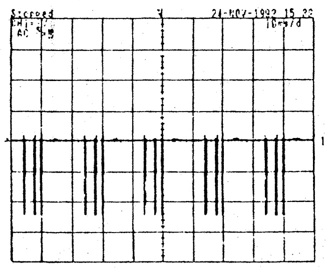
㉑ IC301 ⑪ 2 V/DIV 10 ms/DIV
PAL, SECAM REC/PB



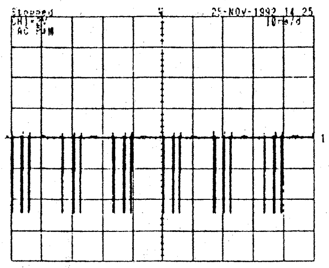
㉑ IC301 ⑪ 2 V/DIV 10 ms/DIV
4.43 REC/PB



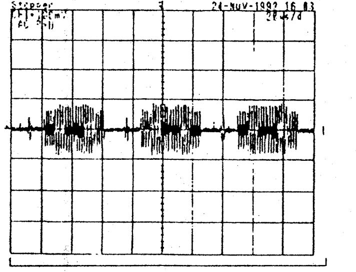
㉒ IC301 ㉒, ㉓ 2 V/DIV 10 ms/DIV
PAL, SECAM REC/PB



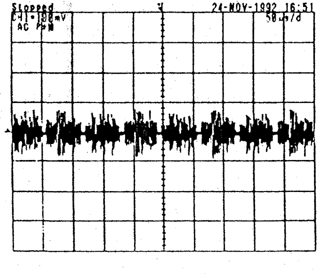
㉒ IC301 ㉒, ㉓ 2 V/DIV 10 ms/DIV
4.43 REC/PB



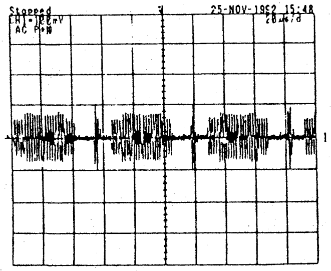
㉓ IC601 ⑬ 100 mV/DIV 20 μs/DIV
PAL REC



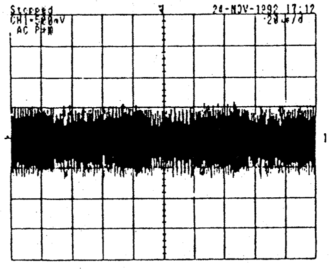
㉓ IC601 ⑬ 100 mV/DIV 50 μs/DIV
SECAM REC



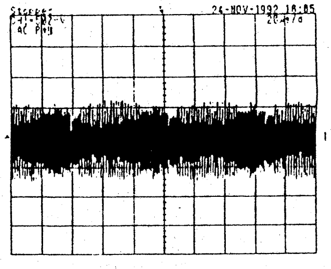
㉓ IC601 ⑬ 100 mV/DIV 20 μs/DIV
4.43 REC



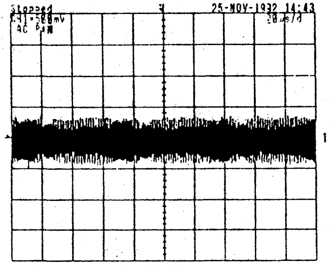
㉔ IC601 ⑮ 500 mV/DIV 20 μs/DIV
SECAM PB



㉔ IC601 ⑮ 500 mV/DIV 20 μs/DIV
PAL PB



㉔ IC601 ⑮ 500 mV/DIV 20 μs/DIV
4.43 PB



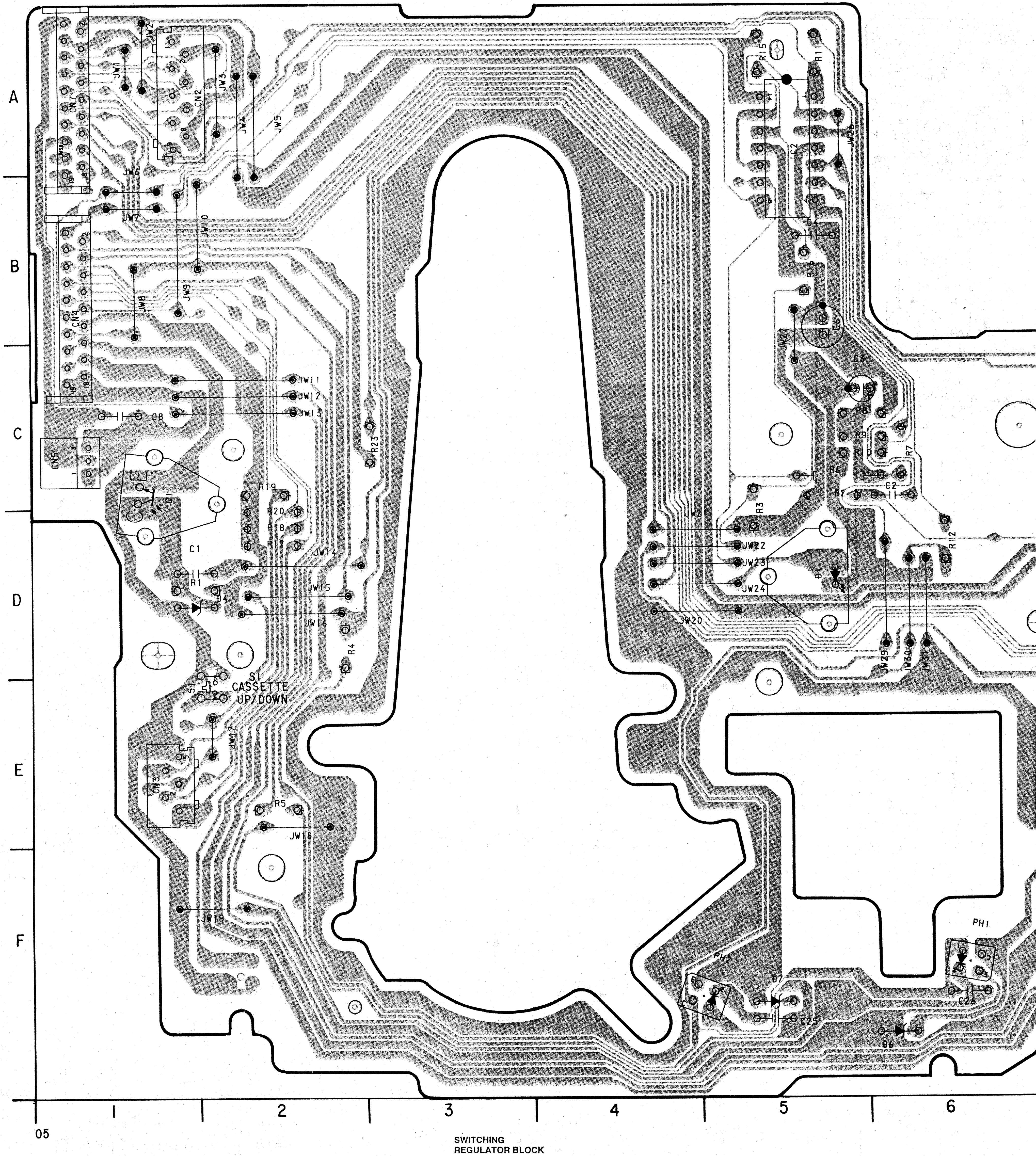
MD-56 BOAR

CN001	A-
CN002	A-
CN003	E-
CN004	B-
CN005	C-
CN006	F-
CN007	A-
D1	D
D4	D
D5	D
D6	G
D7	F-
IC1	B-
IC2	A-
IC3	C
PH1	F-
PH2	F-
Q1	C
Q2	C

MD-56 (MECHANISM DRIVE), CA-41 (CAM MOTOR), CM-14 (LOADING MOTOR) PRINTED WIRING BOARDS

– Ref. No.: MD-56, CA-41 and CM-14 Boards; 3,000 series –

MD-56 BOARD



A
B
C
D
E
F
1
2
3
4
5
6
05
CN7
CN2
CN4
CN5
CN3
JW1
JW2
JW3
JW4
JW5
JW6
JW7
JW8
JW9
JW10
JW11
JW12
JW13
JW14
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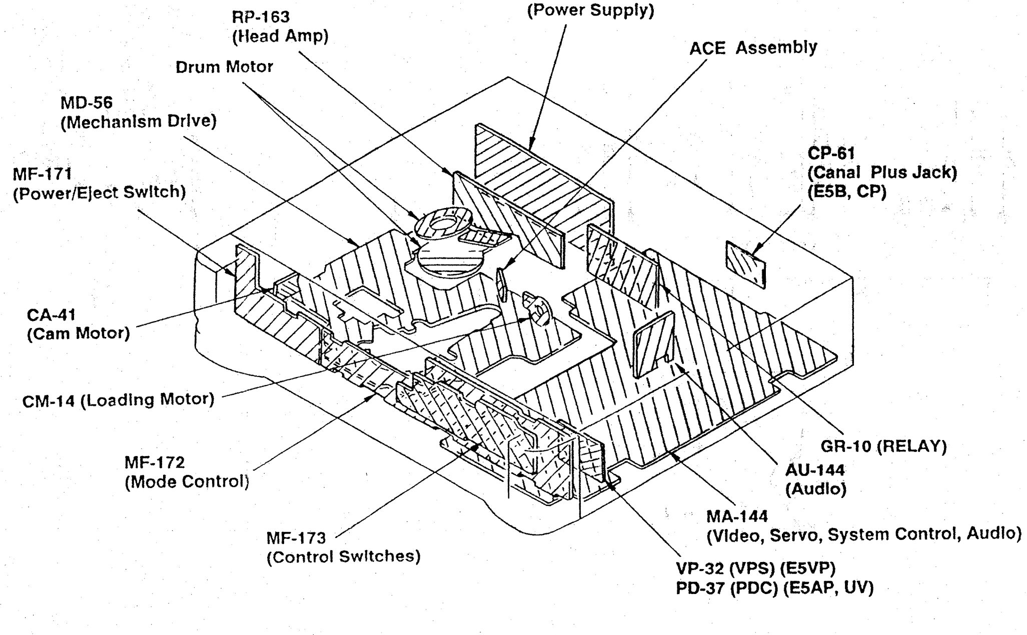
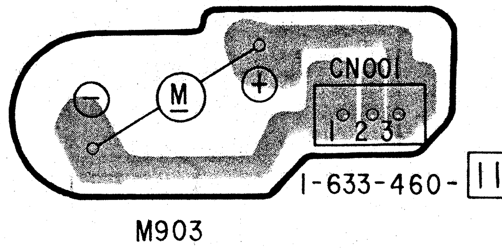
JW18
JW19
JW20
JW21
JW22
JW23
JW24
JW26
JW27
JW29
JW30
JW31
C1
C2
C3
C4
C6
C8
C25
C26
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R15
R16
R17
R18
R19
R20
R23
IC2
Q1
D1
D4
D6
D7
PH1
PH2
S1
S1
CASSETTE
UP/DOWN

MD-56 BOARD	
CN001	A-8
CN002	A-1
CN003	E-1
CN004	B-1
CN005	C-1
CN006	F-9
CN007	A-1
D1	D-5
D4	D-2
D5	D-9
D6	G-6
D7	F-5
IC1	B-8
IC2	A-5
IC3	C-8
PH1	F-4
PH2	F-6
Q1	C-1
Q2	C-9



SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
Drum Motor
ACE Assembly
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CP-61
(Canal Plus Jack)
(E5B, CP)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144
(Audio)
MF-172
(Mode Control)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)

CA-41 BOARD



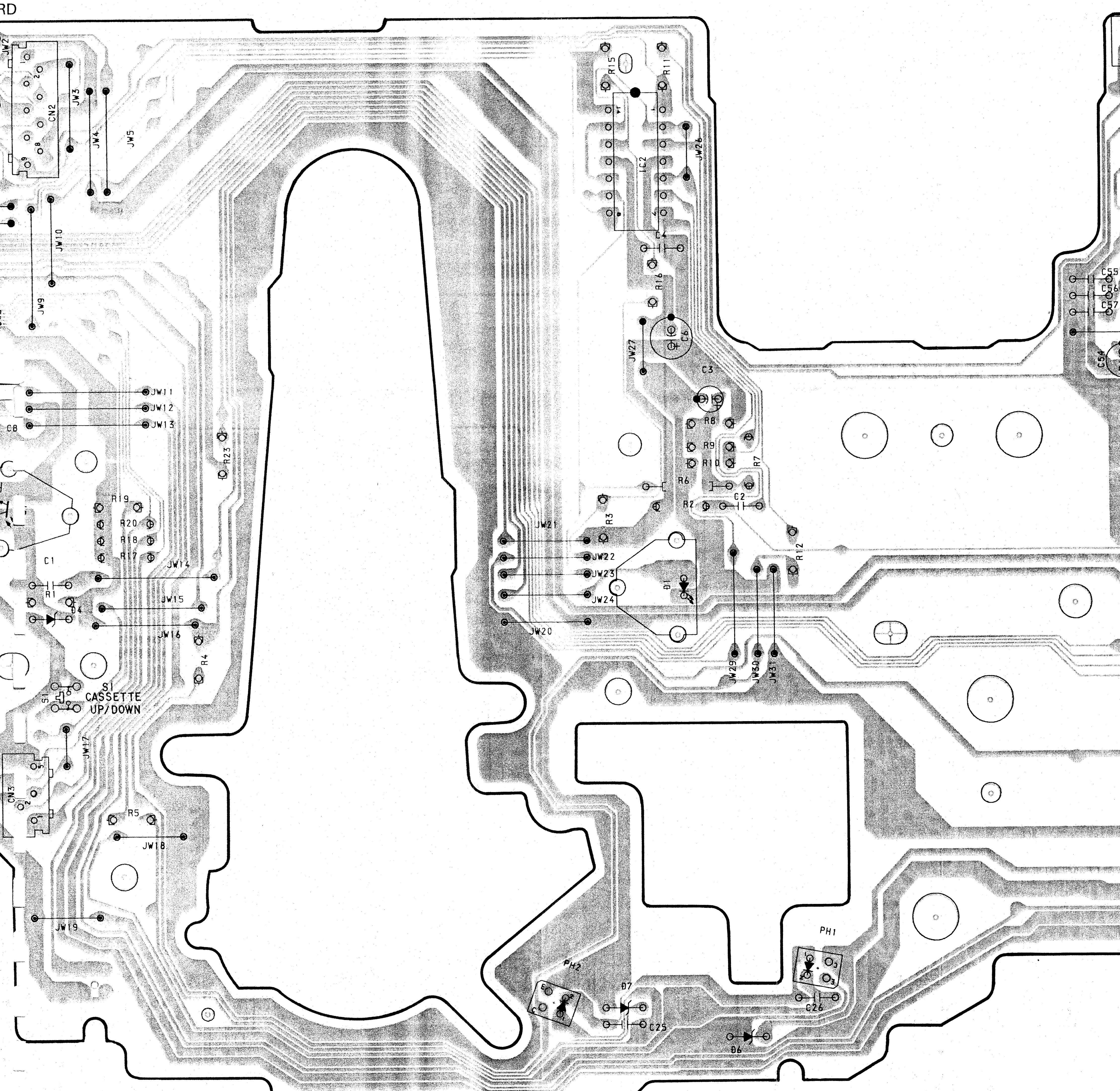
M
+
–
CN001
1 2 3
1-633-460-

M903
CAM MOTOR

RIVE), CA-41 (CAM MOTOR), CM-14 (LOADING MOTOR) PRINTED WIRING BOARDS

and CM-14 Boards; 3,000 series –

RD


JW2
CN2
JW3
JW4
JW5
JW10
JW9
JW11
JW12
JW13
C8
R23
R19
R20
R18
R17
C1
R1
JW14
JW15
D4
JW16
R4
S1
S1
CASSETTE
UP/DOWN
JW17
CN3
R5
JW18
JW19
R15
R11
IC2
JW26
C4
R16
C6
JW27
C3
R8
R9
R10
R7
R6
R2
C2
R3
JW21
JW22
JW23
JW24
JW20
D1
R12
JW29
JW30
JW31
PH1
PH2
D7
C25
C26
D6
C55
C56
C57
C54
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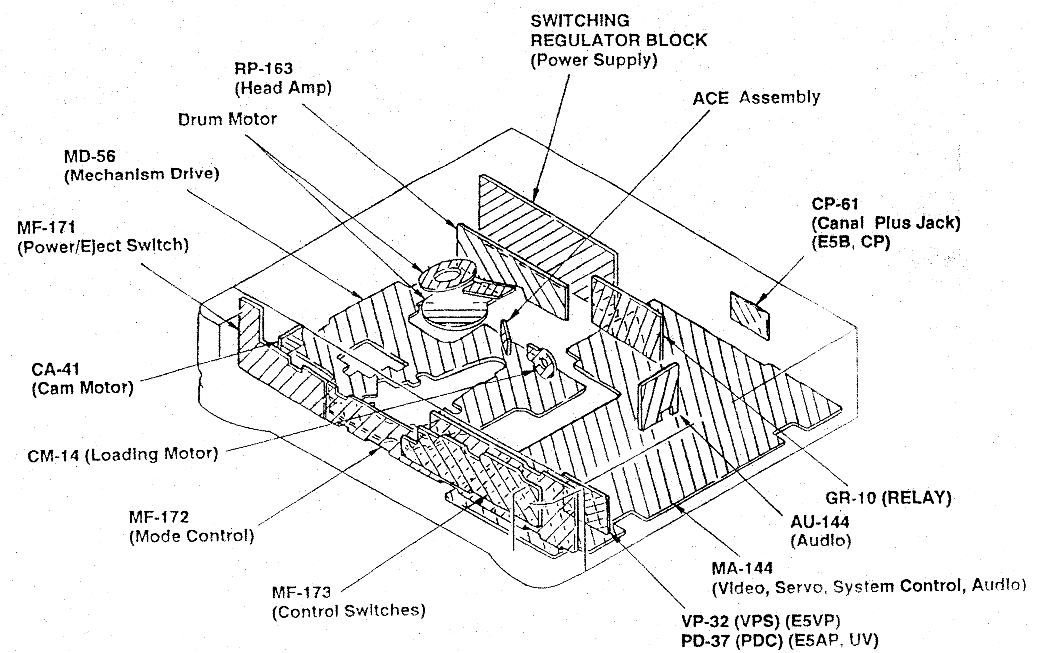
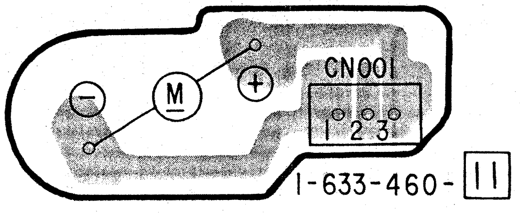
6
7

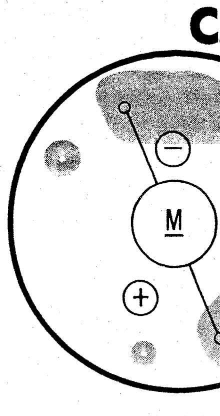

SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
ACE Assembly
Drum Motor
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CP-61
(Canal Plus Jack)
(E5B, CP)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144
(Audio)
MF-172
(Mode Control)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)

CA-41 BOARD

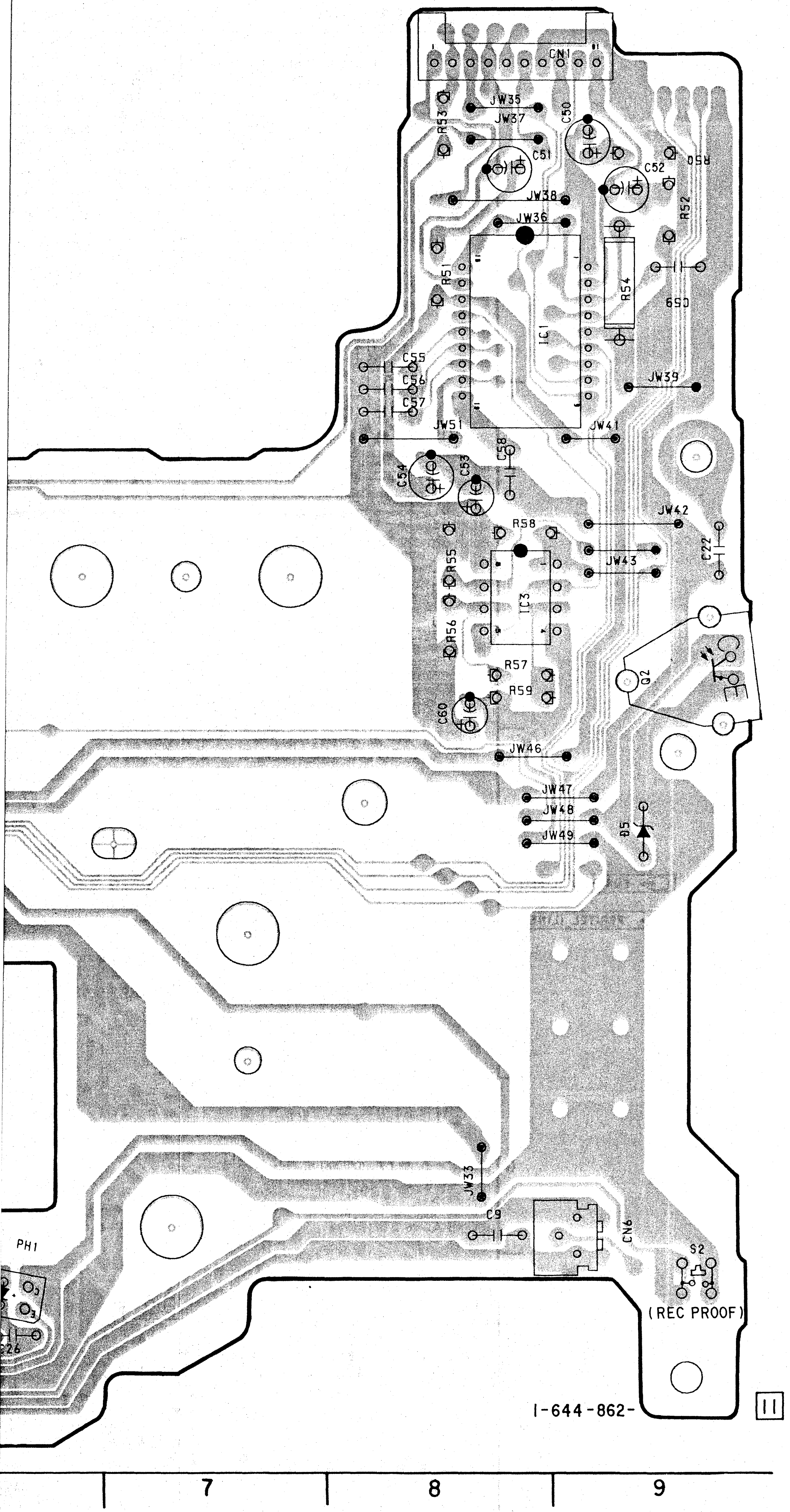

M
CN001
1 2 3
1-633-460-11

M903
CAM MOTOR

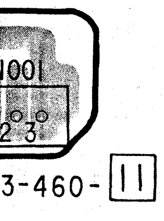
C



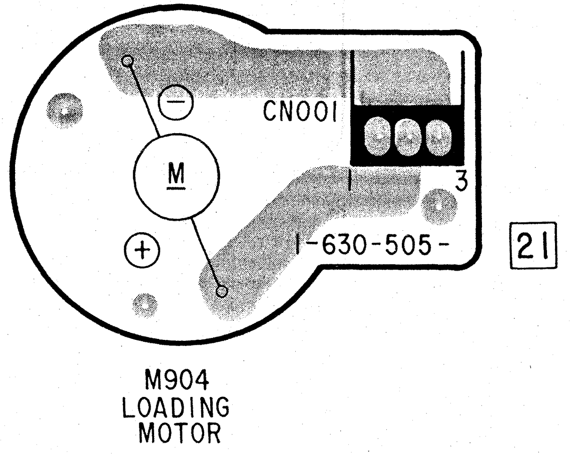
M904
LOADING
MOTOR


CN1
JW35
JW37
C50
R53
C51
C52
R50
JW38
JW36
R52
R51
R54
IC1
C59
C55
C56
C57
JW39
JW51
JW41
C58
C54
C53
R58
JW42
C22
R55
JW43
IC3
R56
Q2
R57
R59
C60
JW46
JW47
JW48
JW49
D5
JW33
C9
CN6
S2
(REC PROOF)
PH1
C26
1-644-862-
11
7
8
9

OARD


001
2 3
3-460-
11

CM-14 BOARD


CN001
3
M
1-630-505-
21

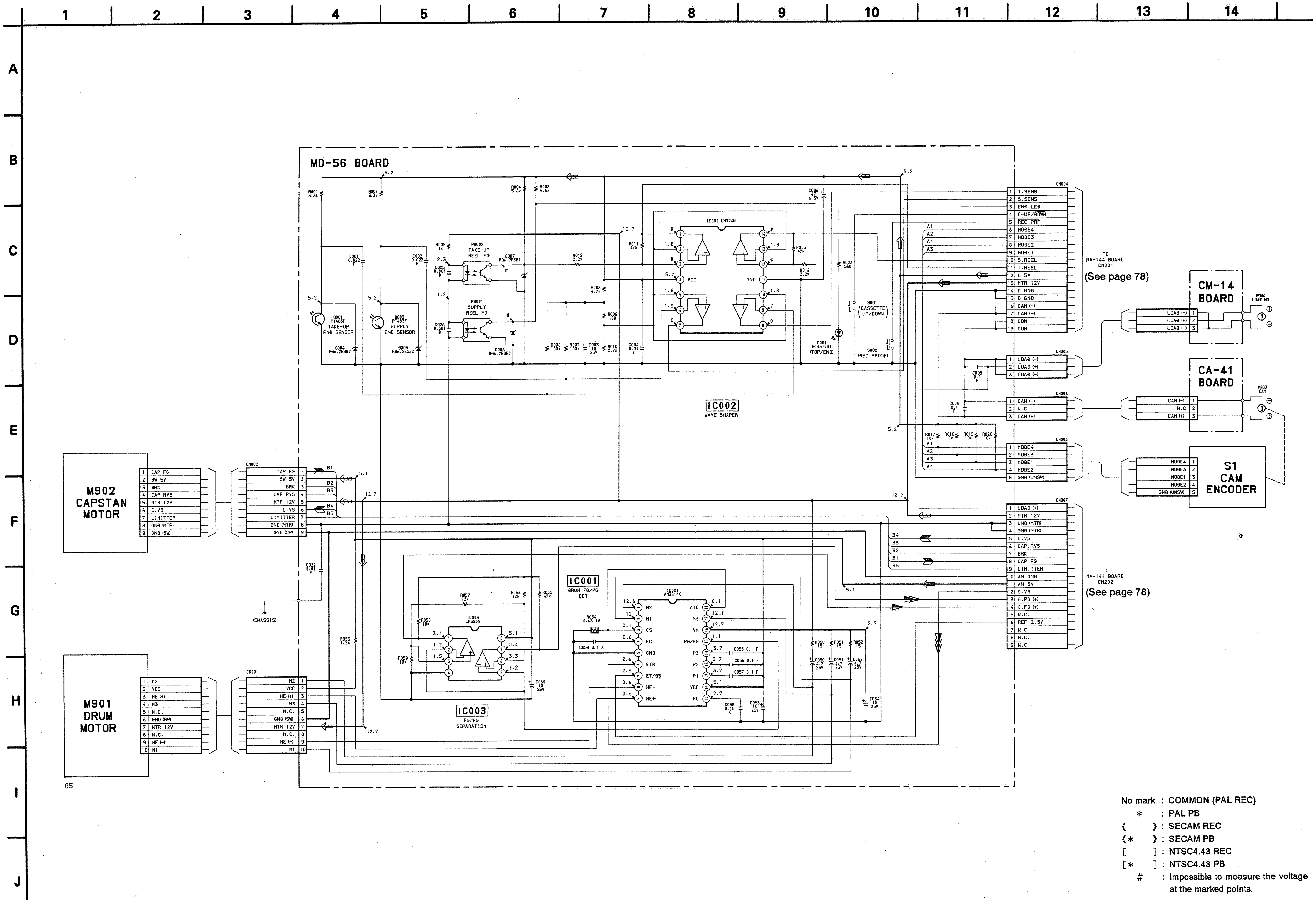
M904
LOADING
MOTOR

- Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷▷	
Drum servo (speed and phase)		▷▷▷	
Capstan speed servo		⇨	
Capstan phase servo	➡›	⇨›	⇨›
Capstan servo (speed and phase)		⇨››	
Ref. signal	➡		⇨

MD-56 (MECHANISM DRIVE), CA-41 (CAM MOTOR), CM-14 (LOADING MOTOR) SCHEMATIC DIAGRAM

– Ref. No.: MD-56, CA-41 and CM-14 Boards; 3,000 series –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12
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14
A
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C
D
E
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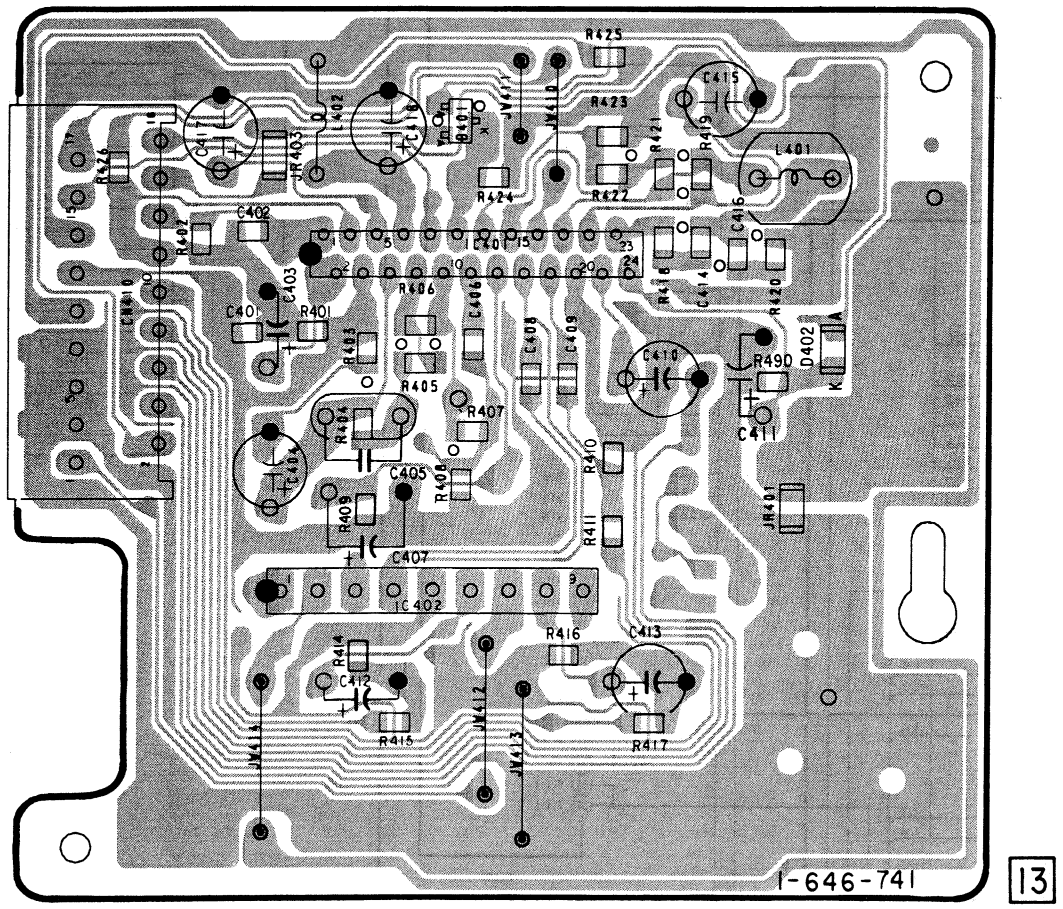
G
H
I
J
MD-56 BOARD
IC002 LM324N
IC002
WAVE SHAPER
IC001
DRUM FG/PG DET
IC001 AN3814K
IC003
FG/PG SEPARATION
IC003 LM393N
PH002 TAKE-UP REEL FG
PH001 SUPPLY REEL FG
Q001 PT483F TAKE-UP END SENSOR
Q002 PT483F SUPPLY END SENSOR
D001 GL451YS1 (TOP/END)
S001 (CASSETTE UP/DOWN)
S002 (REC PROOF)
CN004
T.SENS
S.SENS
END LED
C-UP/DOWN
REC PRF
MODE4
MODE3
MODE2
MODE1
S.REEL
T.REEL
D 5V
MTR 12V
D GND
D GND
CAM (+)
CAM (+)
COM
COM
TO MA-144 BOARD CN201
(See page 78)
CN005
LOAD (-)
LOAD (+)
LOAD (-)
CN006
CAM (-)
N.C
CAM (+)
CN003
MODE4
MODE3
MODE1
MODE2
GND (UNSW)
CN007
LOAD (+)
MTR 12V
GND (MTR)
GND (MTR)
C.VS
CAP.RVS
BRK
CAP FG
LIMITTER
AN GND
AN 5V
D.VS
D.PG (+)
D.FG (+)
N.C.
REF 2.5V
N.C.
N.C.
N.C.
TO MA-144 BOARD CN202
(See page 78)
CM-14 BOARD
M904 LOADING
LOAD (-)
LOAD (+)
LOAD (-)
CA-41 BOARD
M903 CAM
CAM (-)
N.C
CAM (+)
S1 CAM ENCODER
M902 CAPSTAN MOTOR
CAP FG
SW 5V
BRK
CAP RVS
MTR 12V
C.VS
LIMITTER
GND (MTR)
GND (SW)
CN002
M901 DRUM MOTOR
M2
VCC
HE (+)
M3
N.C.
GND (SW)
MTR 12V
N.C.
HE (-)
M1
CN001
(CHASSIS)
05

No mark : COMMON (PAL REC)
* : PAL PB
( ) : SECAM REC
(*) : SECAM PB
[ ] : NTSC4.43 REC
[*] : NTSC4.43 PB
: Impossible to measure the voltage at the marked points.

AU-144 (AUDIO) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: AU-144 Board; 4,000 series –

AU-144 BOARD



R425
R423
R424
R422
R421
R419
C415
L401
C411
C417
JR403
L402
JR411
JR410
R426
R402
C402
C403
C401
R401
CN410
IC401
R418
C414
C416
R420
D402
A
K
R406
C406
C408
C409
C410
R490
C411
R403
R405
R407
R404
C404
C405
R408
R410
R409
C407
R411
JR401
IC402
R416
C413
R414
C412
R415
R417
JW413
JW412
JW414
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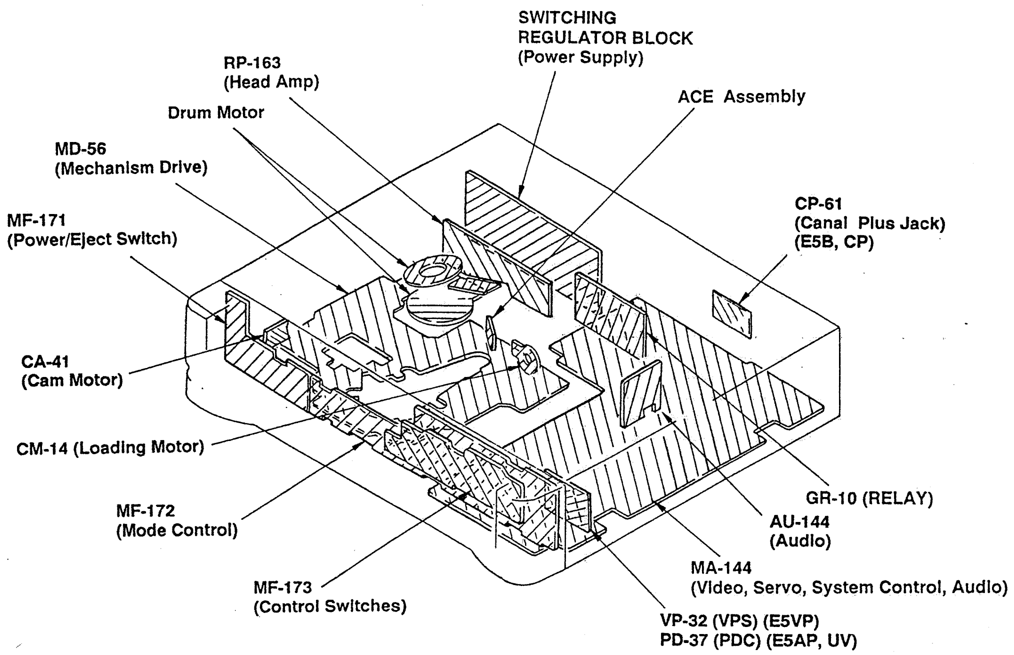
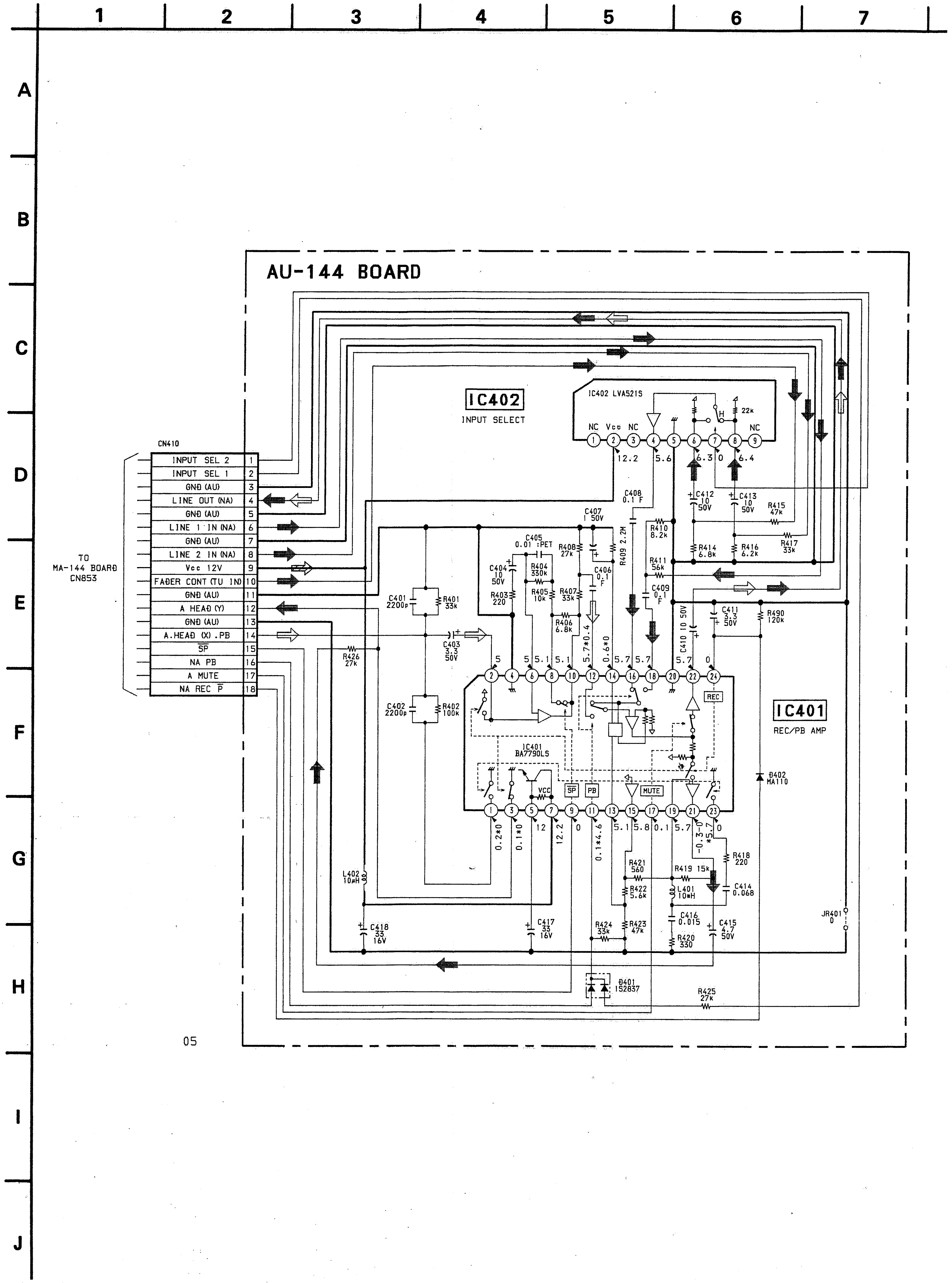
15
20
23
24
1-646-741
13



SWITCHING
REGULATOR BLOCK
(Power Supply)
RP-163
(Head Amp)
Drum Motor
ACE Assembly
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CP-61
(Canal Plus Jack)
(E5B, CP)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144
(Audio)
MF-172
(Mode Control)
MA-144
(Video, Servo, System Control, Audio)
MF-173
(Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)



1
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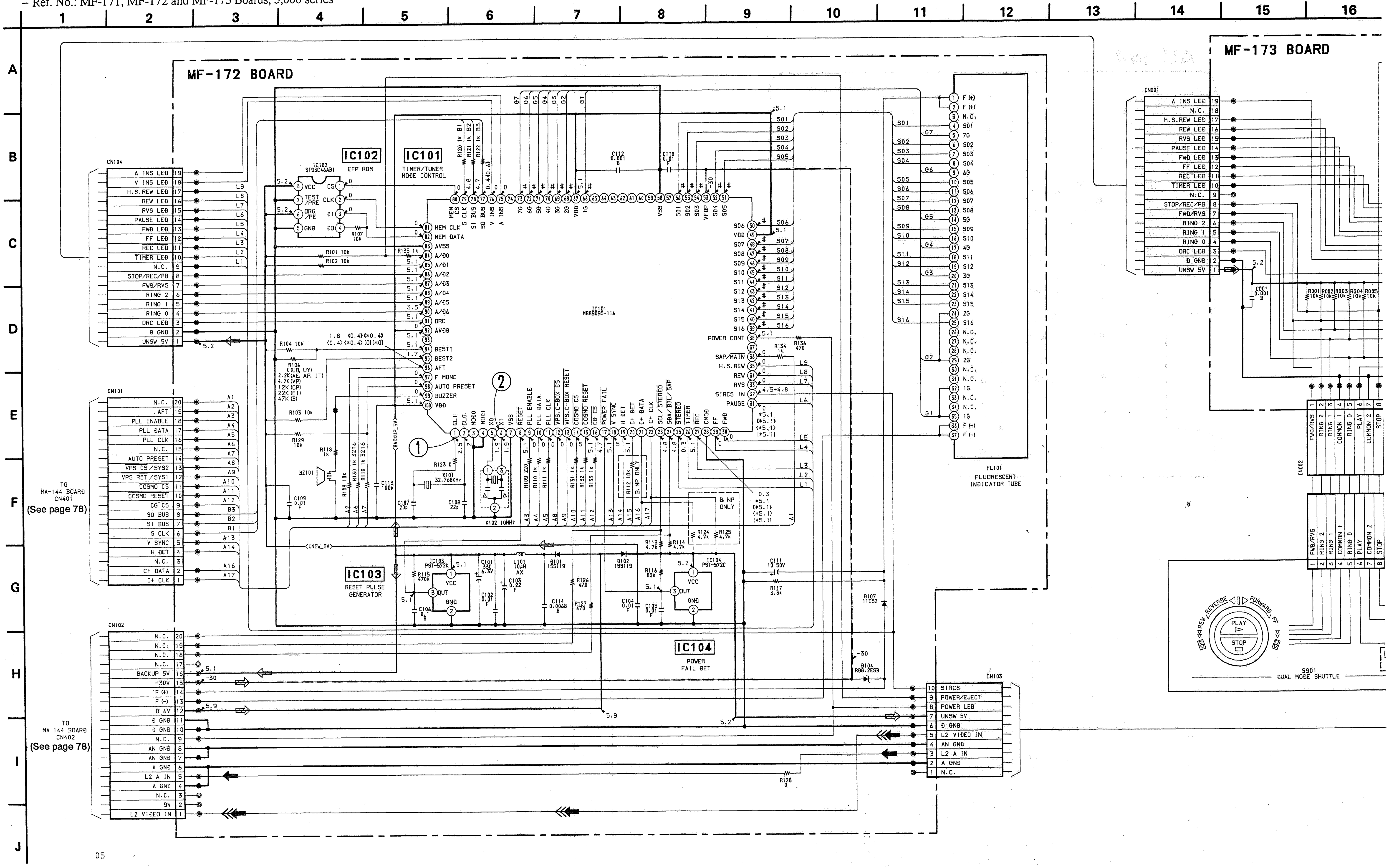
A
B
C
D
E
F
G
H
I
J
AU-144 BOARD
IC402
INPUT SELECT
IC402 LVA521S
NC Vcc NC
NC
22k
12.2
5.6
6.3
0
6.4
CN410
INPUT SEL 2
INPUT SEL 1
GND (AU)
LINE OUT (NA)
GND (AU)
LINE 1 IN (NA)
GND (AU)
LINE 2 IN (NA)
Vcc 12V
FADER CONT (TU IN)
GND (AU)
A HEAD (Y)
GND (AU)
A.HEAD (X) .PB
SP
NA PB
A MUTE
NA REC P
TO
MA-144 BOARD
CN853
C408 0.1 F
C407 1 50V
C412 10 50V
C413 10 50V
R415 47k
R410 8.2k
R414 6.8k
R416 6.2k
R417 33k
R409 2.2M
R411 56k
C409 0.1 F
C405 0.01 PET
R408 27k
C404 10 50V
R404 330k
C406 0.1
R403 220
R405 10k
R407 33k
R406 6.8k
C401 2200p
R401 33k
C403 3.3 50V
R426 27k
C402 2200p
R402 100k
C410 10 50V
C411 3.3 50V
R490 120k
IC401
REC/PB AMP
IC401 BA7790LS
REC
VCC
SP
PB
MUTE
D402 MA110
R418 220
R421 560
R419 15k
R422 5.6k
L401 10mH
C414 0.068
L402 10mH
C418 33 16V
C417 33 16V
R424 33k
R423 47k
C416 0.015
C415 4.7 50V
R420 330
JR401 0
D401 1S2837
R425 27k
05

MF-171 (POWER/EJECT SWITCHES), MF-172 (MODE CONTROL), MF-173 (CONTROL SWITCHES) PRINTED WIRING BOARDS

– Ref. No.: MF-171, MF-172 and MF-173 Boards; 5,000 series –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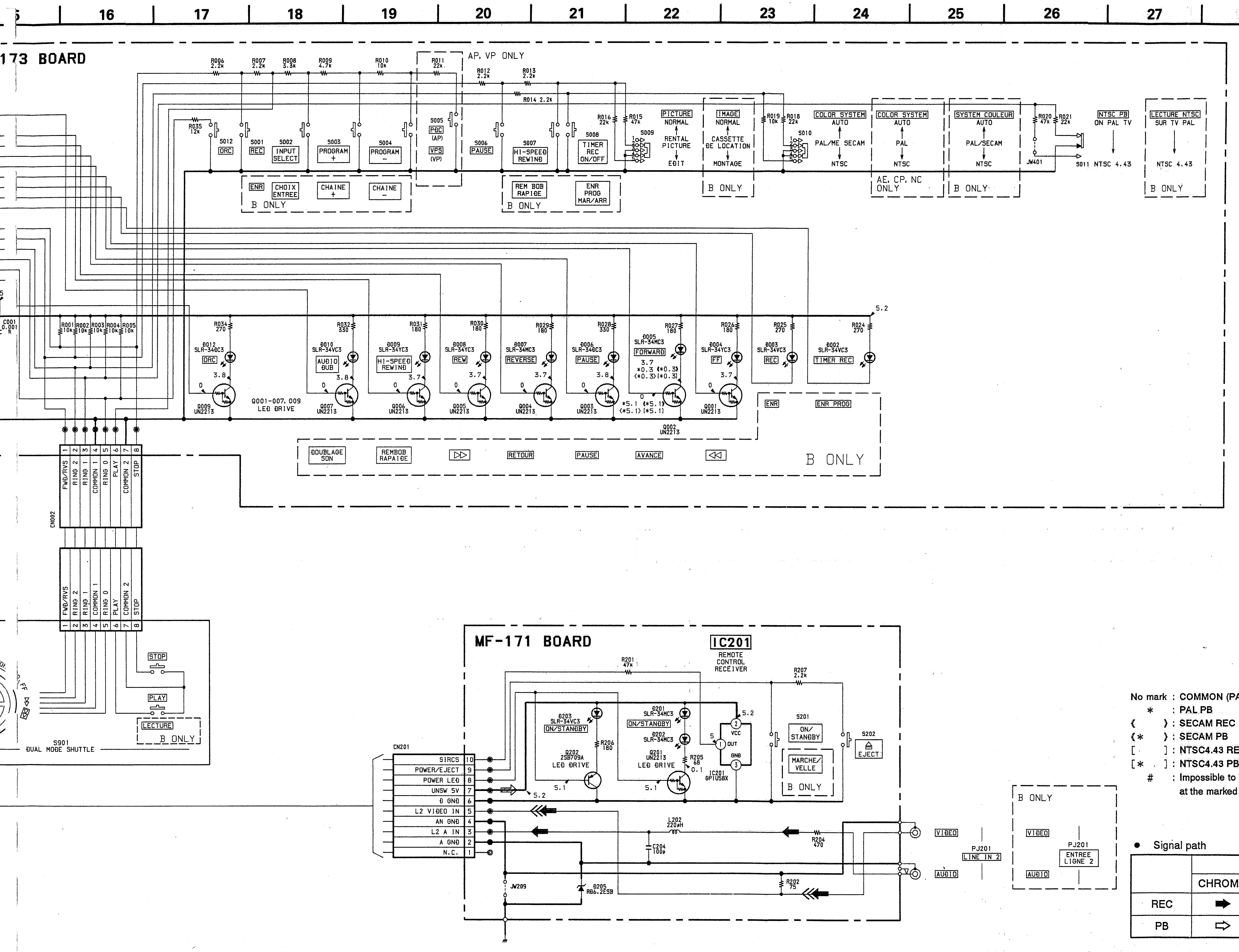
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
MF-172 BOARD
MF-173 BOARD
IC101
TIMER/TUNER MODE CONTROL
IC101 MB89095-116
IC102
EEP ROM
IC102 ST93C46AB1
IC103
RESET PULSE GENERATOR
IC103 PST-572K
IC104
POWER FAIL DET
IC104 PST-572C
FL101
FLUORESCENT INDICATOR TUBE
S901
DUAL MODE SHUTTLE
PLAY
STOP
REV
REVERSE
FORWARD
FF
CN104
A INS LED
V INS LED
H.S.REW LED
REW LED
RVS LED
PAUSE LED
FWD LED
FF LED
REC LED
TIMER LED
N.C.
STOP/REC/PB
FWD/RVS
RING 2
RING 1
RING 0
ORC LED
D GND
UNSW 5V
TO MA-144 BOARD CN401
(See page 78)
CN101
AFT
PLL ENABLE
PLL DATA
PLL CLK
AUTO PRESET
VPS CS/SYS2
VPS RST/SYS1
COSMO CS
COSMO RESET
CG CS
S0 BUS
S1 BUS
S CLK
V SYNC
H DET
C+ DATA
C+ CLK
CN102
BACKUP 5V
-30V
F (+)
F (-)
D 6V
D GND
AN GND
A GND
L2 A IN
9V
L2 VIDEO IN
TO MA-144 BOARD CN402
(See page 78)
CN103
SIRCS
POWER/EJECT
POWER LED
UNSW 5V
D GND
L2 VIDEO IN
AN GND
L2 A IN
A GND
N.C.
CN001
CN002
FWD/RVS
RING 2
RING 1
COMMON 1
RING 0
PLAY
COMMON 2
STOP
MEM CLK
MEM DATA
AVSS
A/D0
A/D1
A/D2
A/D3
A/D4
A/D5
A/D6
ORC
AVDD
DEST1
DEST2
AFT
F MONO
AUTO PRESET
BUZZER
VDD
CL1
CL0
MOD0
MOD1
X0
X1
VSS
RESET
POWER CONT
SAP/MAIN
H.S.REW
REW
RVS
SIRCS IN
PAUSE
SCL/STEREO
SDA/BIL/SAP
STEREO
TIMER
REC
CMOD
FF
FWD
X101 32.768KHz
X102 10MHz
BZ101
L101 10uH
D101 1SS119
D102 1SS119
D104 RD8.2ESB
D107 11ES2
B, NP ONLY
<UNSW_5V>
<BACKUP_5V>
05

MODE CONTROL **MODE CONTROL**


16
17
18
19
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21
22
23
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25
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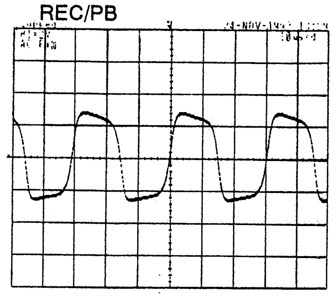
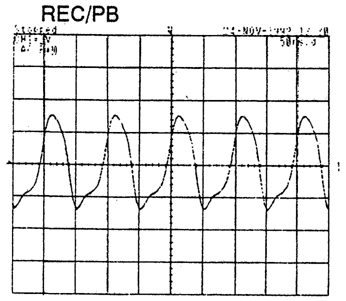
27
28
29
30
A
B
C
D
E
F
G
H
I
J
173 BOARD
AP, VP ONLY
R006 2.2k
R007 2.2k
R008 3.3k
R009 4.7k
R010 10k
R011 22k
R012 2.2k
R013 2.2k
R014 2.2k
R035 12k
S012 DRC
S001 REC
S002 INPUT SELECT
S003 PROGRAM +
S004 PROGRAM −
S005 PDC (AP) VPS (VP)
S006 PAUSE
S007 HI-SPEED REWIND
S008 TIMER REC ON/OFF
R016 22k
R015 47k
S009
PICTURE NORMAL RENTAL PICTURE EDIT
IMAGE NORMAL CASSETTE DE LOCATION MONTAGE
B ONLY
R019 10k
R018 22k
S010
COLOR SYSTEM AUTO PAL/ME SECAM NTSC
COLOR SYSTEM AUTO PAL NTSC
AE, CP, NC ONLY
SYSTEM COULEUR AUTO PAL/SECAM NTSC
B ONLY
R020 47k
R021 22k
JW401
NTSC PB ON PAL TV
S011 NTSC 4.43
LECTURE NTSC SUR TV PAL
NTSC 4.43
B ONLY
ENR
CHOIX ENTREE
CHAINE +
CHAINE −
B ONLY
REM BOB RAPIDE
ENR PROG MAR/ARR
B ONLY
5.2
C001 0.001
R001 10k
R002 10k
R003 10k
R004 10k
R005 10k
R034 270
D012 SLR-34DC3 DRC
Q009 UN2213
Q001-007, 009 LED DRIVE
R032 330
D010 SLR-34VC3 AUDIO DUB
Q007 UN2213
R031 180
D009 SLR-34YC3 HI-SPEED REWIND
Q006 UN2213
R030 180
D008 SLR-34YC3 REW
Q005 UN2213
R029 180
D007 SLR-34MC3 REVERSE
Q004 UN2213
R028 330
D006 SLR-34DC3 PAUSE
Q003 UN2213
R027 180
D005 SLR-34MC3 FORWARD
3.7 *0.3 (*0.3) (*0.3) [*0.3]
*5.1 (*5.1) (*5.1) [*5.1]
R026 180
D004 SLR-34YC3 FF
Q001 UN2213
R025 270
D003 SLR-34VC3 REC
R024 270
D002 SLR-34VC3 TIMER REC
Q002 UN2213
ENR
ENR PROG
DOUBLAGE SON
REMBOB RAPAIDE
RETOUR
PAUSE
AVANCE
B ONLY
CN002
FWD/RVS
RING 2
RING 1
COMMON 1
RING 0
PLAY
COMMON 2
STOP
STOP
PLAY
LECTURE
B ONLY
S901 DUAL MODE SHUTTLE
MF-171 BOARD
IC201 REMOTE CONTROL RECEIVER
R201 47k
R207 2.2k
D203 SLR-34VC3 ON/STANDBY
R206 180
Q202 2SB709A LED DRIVE
D201 SLR-34MC3 ON/STANDBY
D202 SLR-34MC3
Q201 UN2213 LED DRIVE
R205 68
IC201 GP1U58X
VCC OUT GND
S201 ON/STANDBY
MARCHE/VELLE
B ONLY
S202 EJECT
CN201
SIRCS 10
POWER/EJECT 9
POWER LED 8
UNSW 5V 7
D GND 6
L2 VIDEO IN 5
AN GND 4
L2 A IN 3
A GND 2
N.C. 1
5.2
5.1
L202 220µH
C204 100p
R204 470
JW209
D205 RD6.2ESB
R202 75
VIDEO
AUDIO
PJ201 LINE IN 2
B ONLY
VIDEO
AUDIO
PJ201 ENTREE LIGNE 2

MF-172 BOARD

❶ IC101 ① 2 V/DIV 10 µs/DIV REC/PB



❷ IC101 ⑥ 2 V/DIV 50 ns/DIV REC/PB



No mark : COMMON (PAL REC)
* : PAL PB
( ) : SECAM REC
(*) : SECAM PB
[ ] : NTSC4.43 REC
[*] : NTSC4.43 PB
# : Impossible to measure the voltage at the marked points.

- Signal path

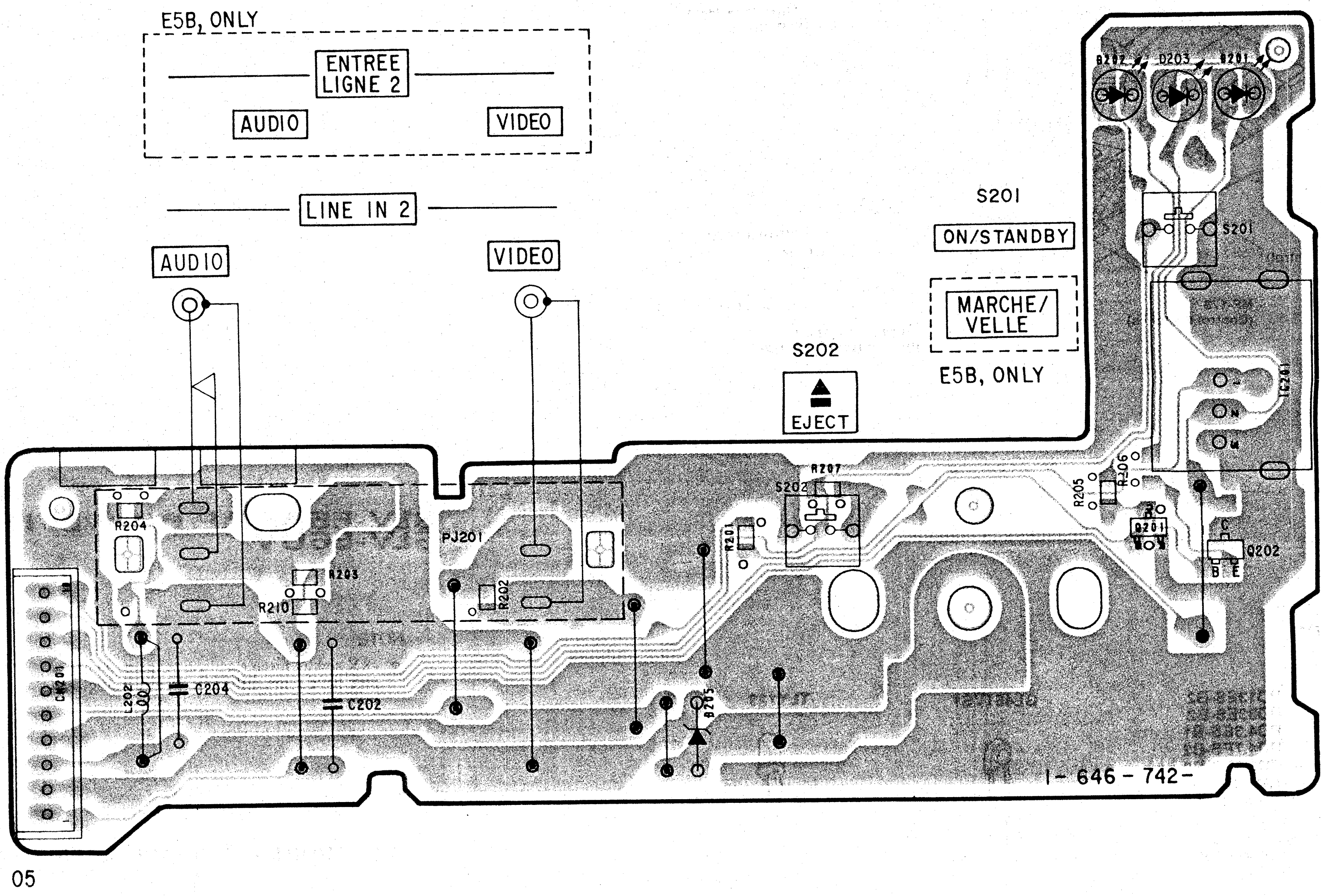
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡»	➡»»	➡
PB	⇨	⇨»	⇨»»	⇨

MODE CONTROL MODE CONTROL

MF-171 (POWER/EJECT SWITCHES), MF-172 (MODE CONTROL), MF-173 (CONTROL SWITCHES) PRINTED WIRING BOARDS

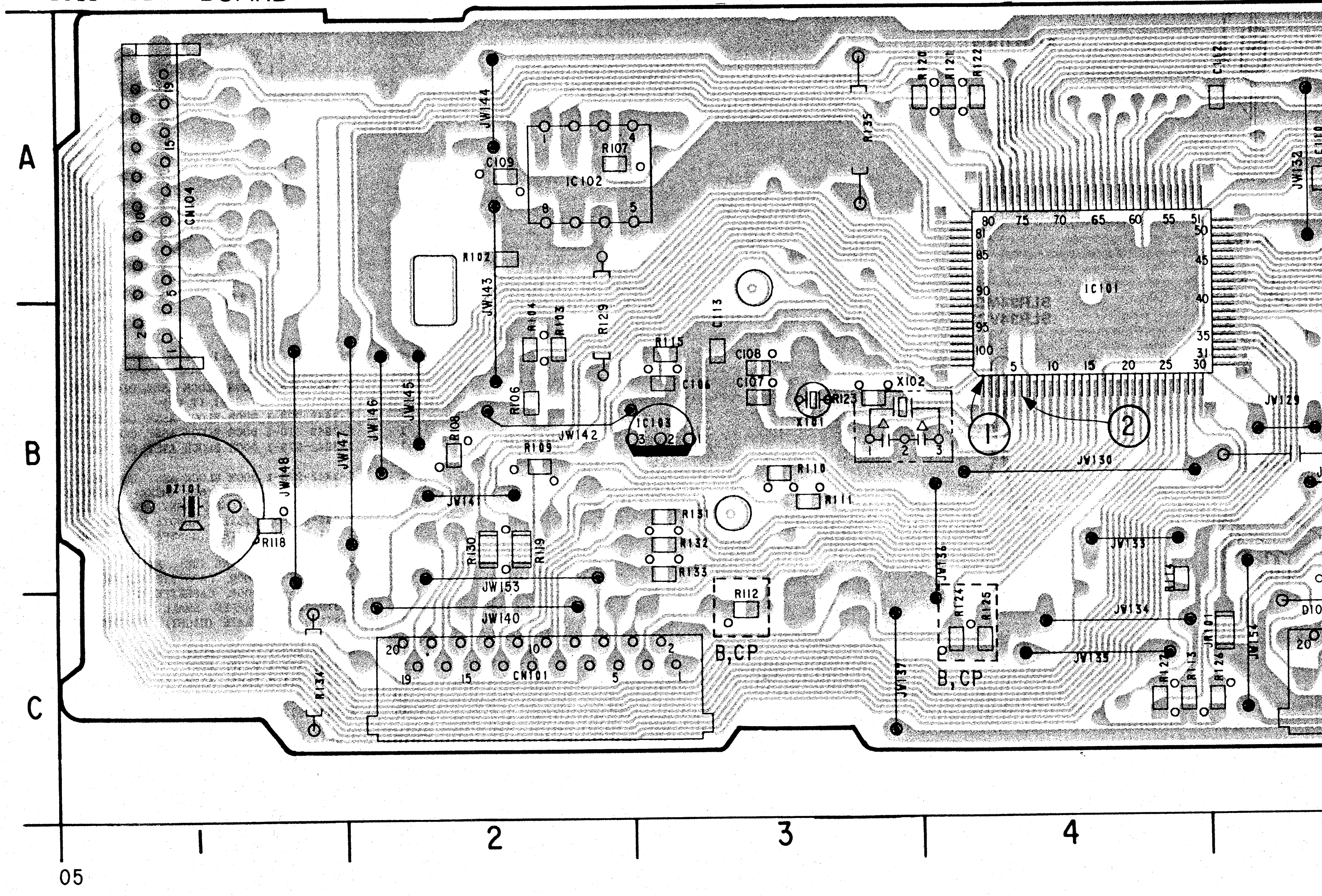
– Ref. No.: MF-171, MF-172 and MF-173 Boards; 5,000 series –

MF-171 BOARD


E5B, ONLY
ENTREE LIGNE 2
AUDIO
VIDEO
LINE IN 2
AUDIO
VIDEO
S202
EJECT
S201
ON/STANDBY
MARCHE/VELLE
E5B, ONLY
D202
D203
D201
S201
IC241
R206
R205
Q201
Q202
R207
S202
R201
PJ201
R204
R203
R210
R202
CN201
L202
C204
C202
D205
1-646-742-
05

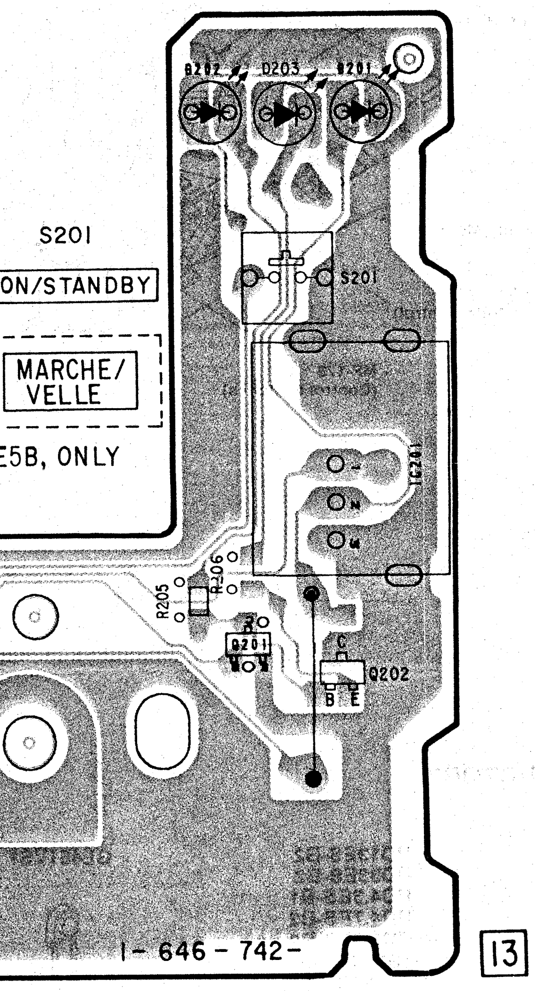
MF-172 BOARD

MF-172 BOARD	
CN101	
CN102	
CN103	
CN104	
D101	B-5
D102	B-5
D104	C-5
D107	C-7
IC101	A-4
IC102	A-2
IC103	B-3
IC104	B-6

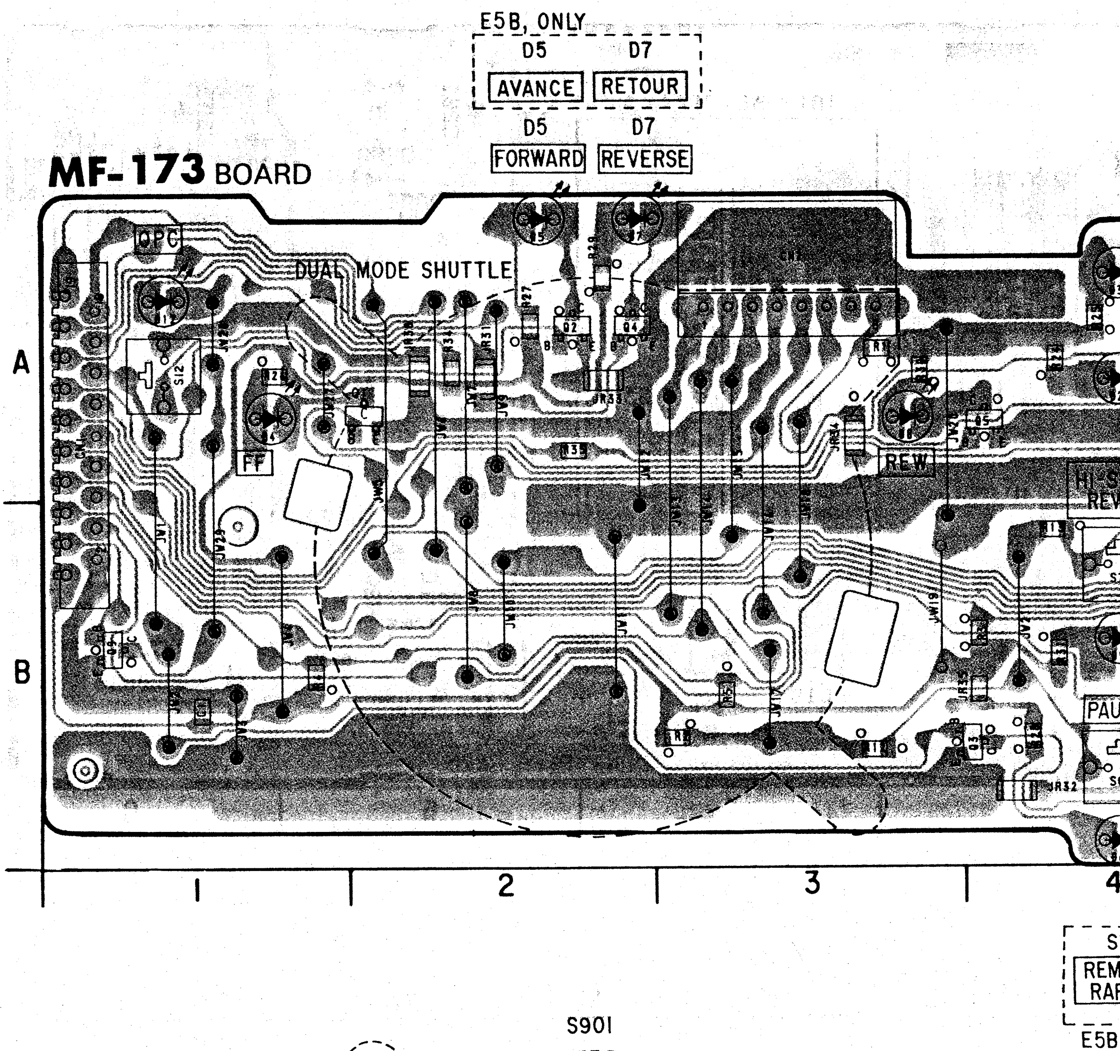

A
B
C
1
2
3
4
05
CN104
BZ101
R118
JW148
JW147
JW146
JW145
JW144
JW143
JW142
JW141
JW153
JW140
C109
IC102
R107
R102
R104
R103
R129
R106
R108
R109
R130
R119
R115
C106
C113
C108
C107
IC103
X101
R123
X102
R135
R120
R121
R122
IC101
JW130
JW129
JW132
JW133
JW134
JW135
JW136
JW137
R110
R111
R131
R132
R133
R112
B,CP
R124
R125
B,CP
CN101
R134
R127
R113
R126
JR101
①
②

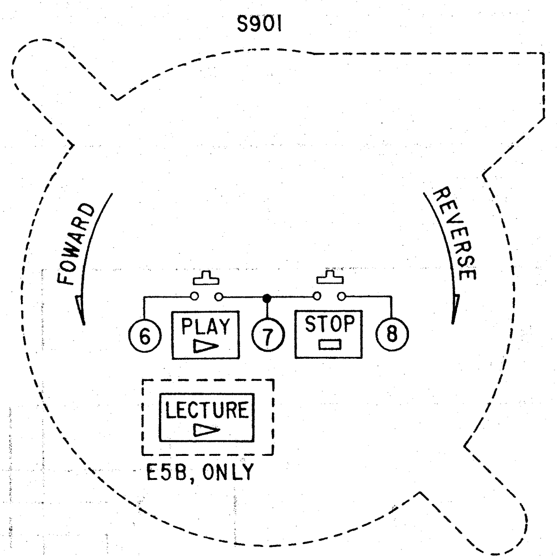
MODE CONTROL MODE CONTROL

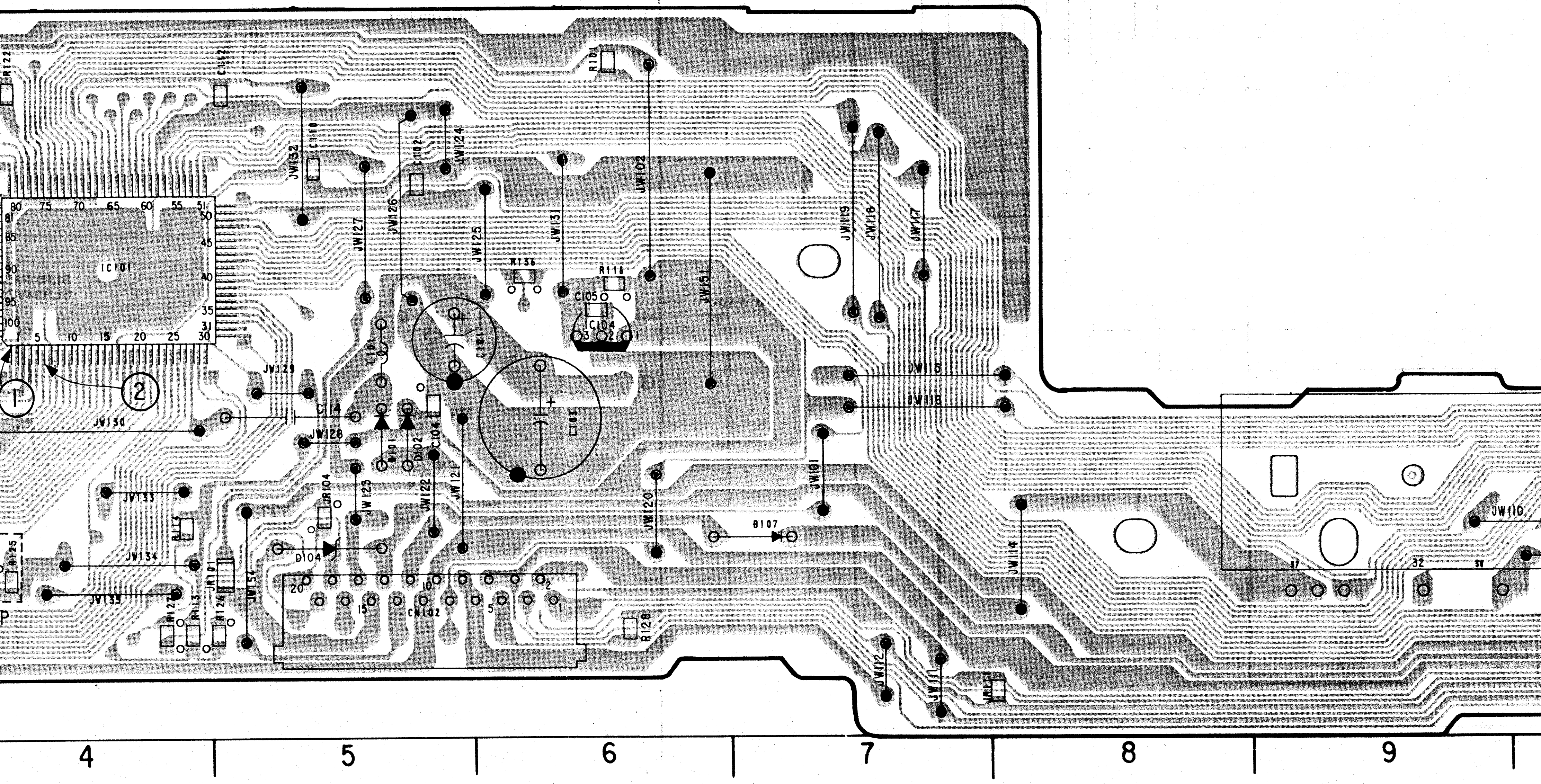
MF-171 BOARD


D202
D203
D201
S201
ON/STANDBY
MARCHE/
VELLE
E5B, ONLY
S201
IC201
R206
R205
Q201
Q202
C
B E
1-646-742-
13

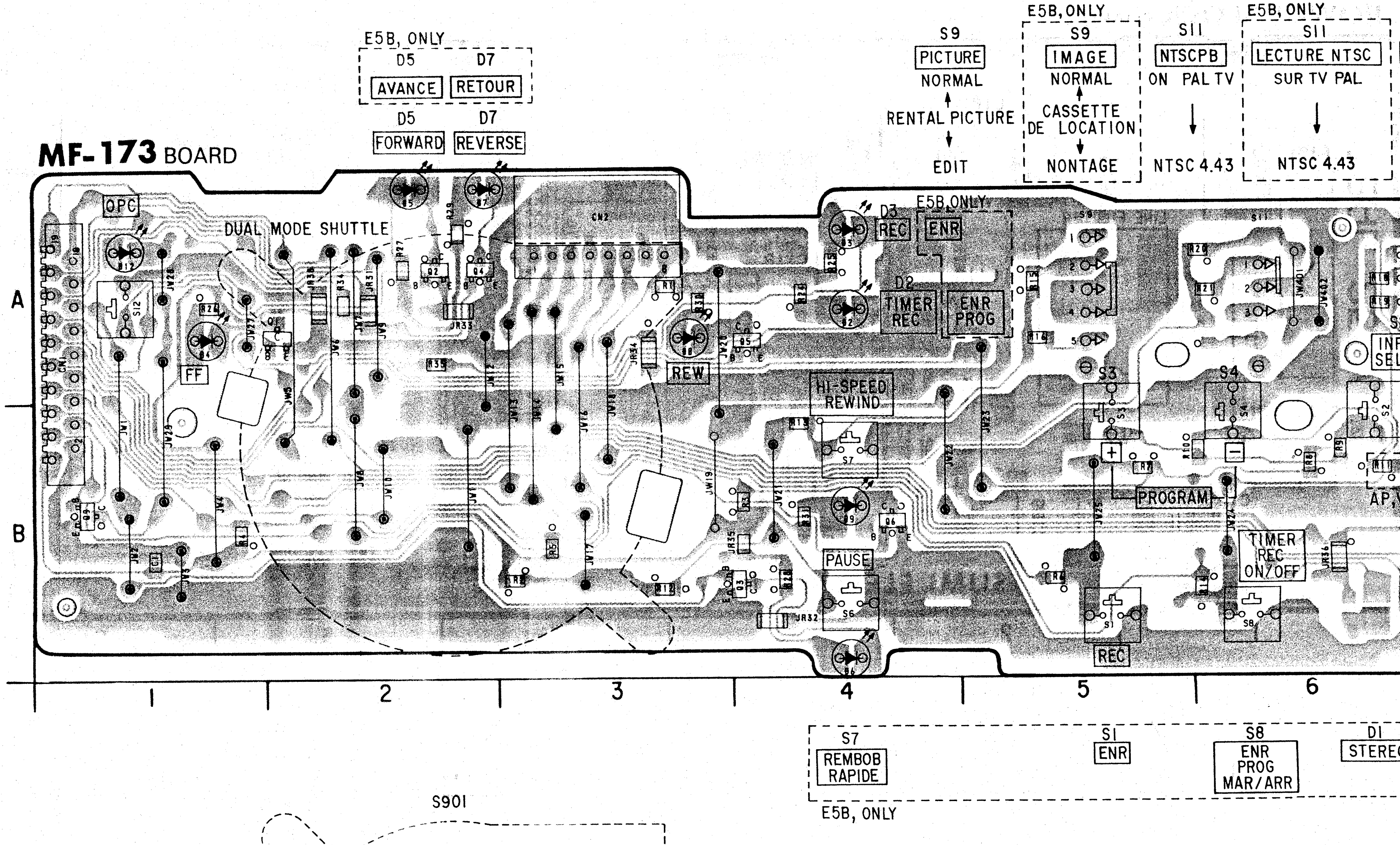
MF-173 BOARD

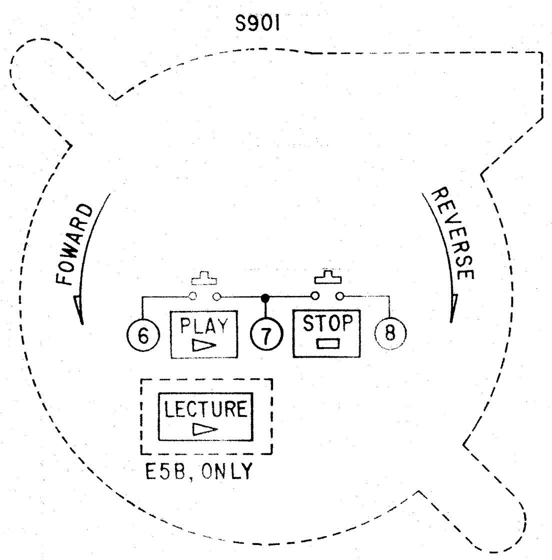

E5B, ONLY
D5
D7
AVANCE
RETOUR
D5
D7
FORWARD
REVERSE
OPC
DUAL MODE SHUTTLE
FF
REW
PAU
A
B
1
2
3
4
E5B

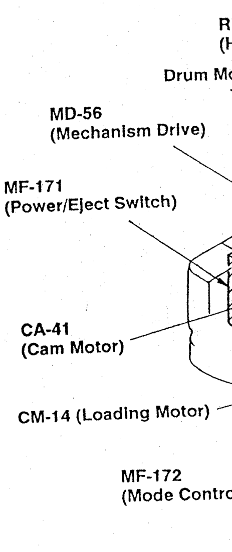

S901
FOWARD
REVERSE
6
PLAY
7
STOP
8
LECTURE
E5B, ONLY

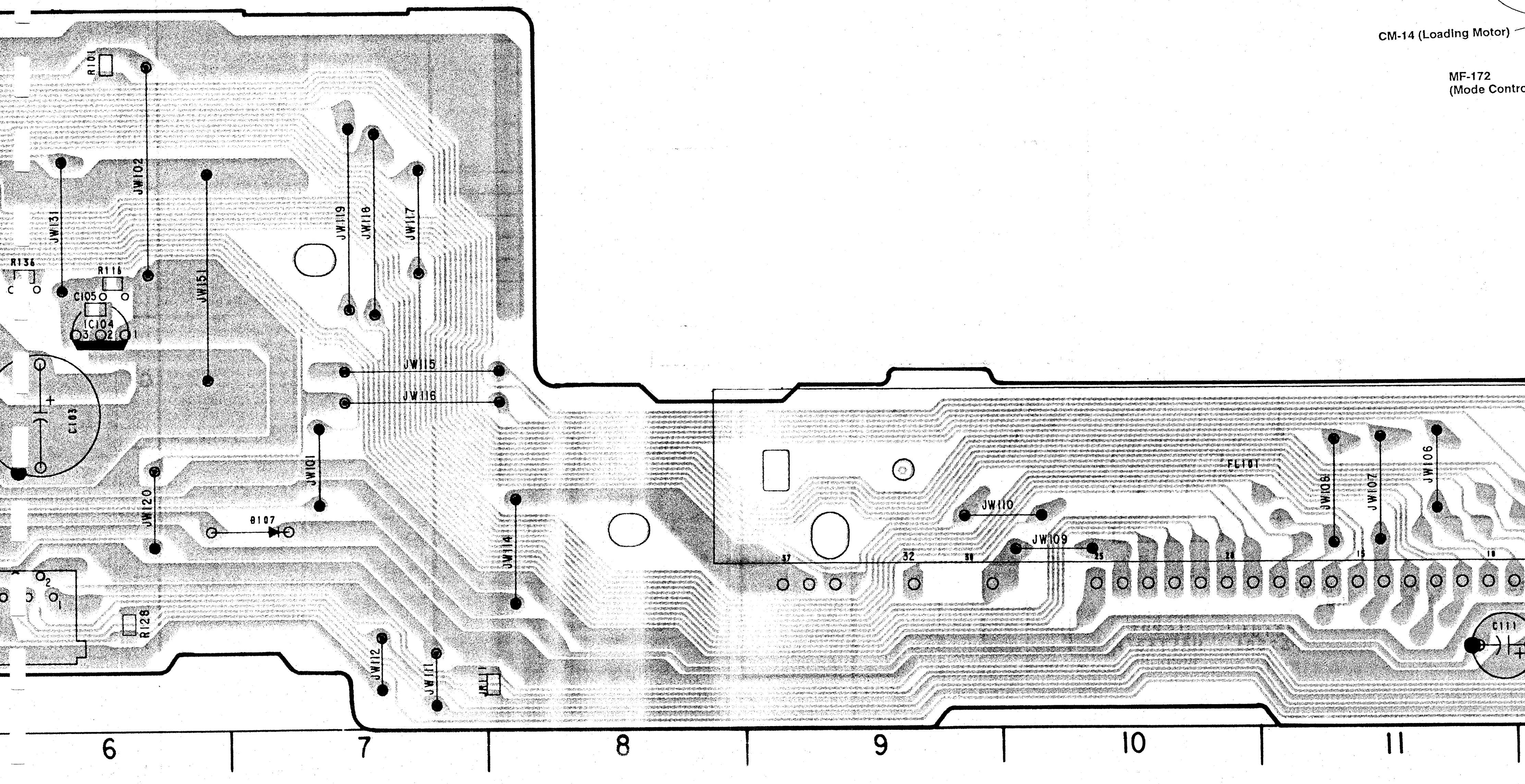

IC101
80
75
70
65
60
55
51
50
45
40
35
31
30
25
20
15
10
5
1
100
95
90
85
1
2
JW130
JW129
JW132
JW127
JW126
JW125
JW124
JW131
JW102
JW151
JW119
JW118
JW117
JW115
JW116
JW114
JW101
JW120
JW121
JW122
JW123
JW128
JW133
JW134
JW135
JW112
JW111
JW110
C114
C101
C104
C103
C105
C102
C112
C110
R101
R116
R136
R126
R128
IC104
D101
D102
D104
D107
CN102
20
15
10
5
1
2
37
32
4
5
6
7
8
9

MODE CONT

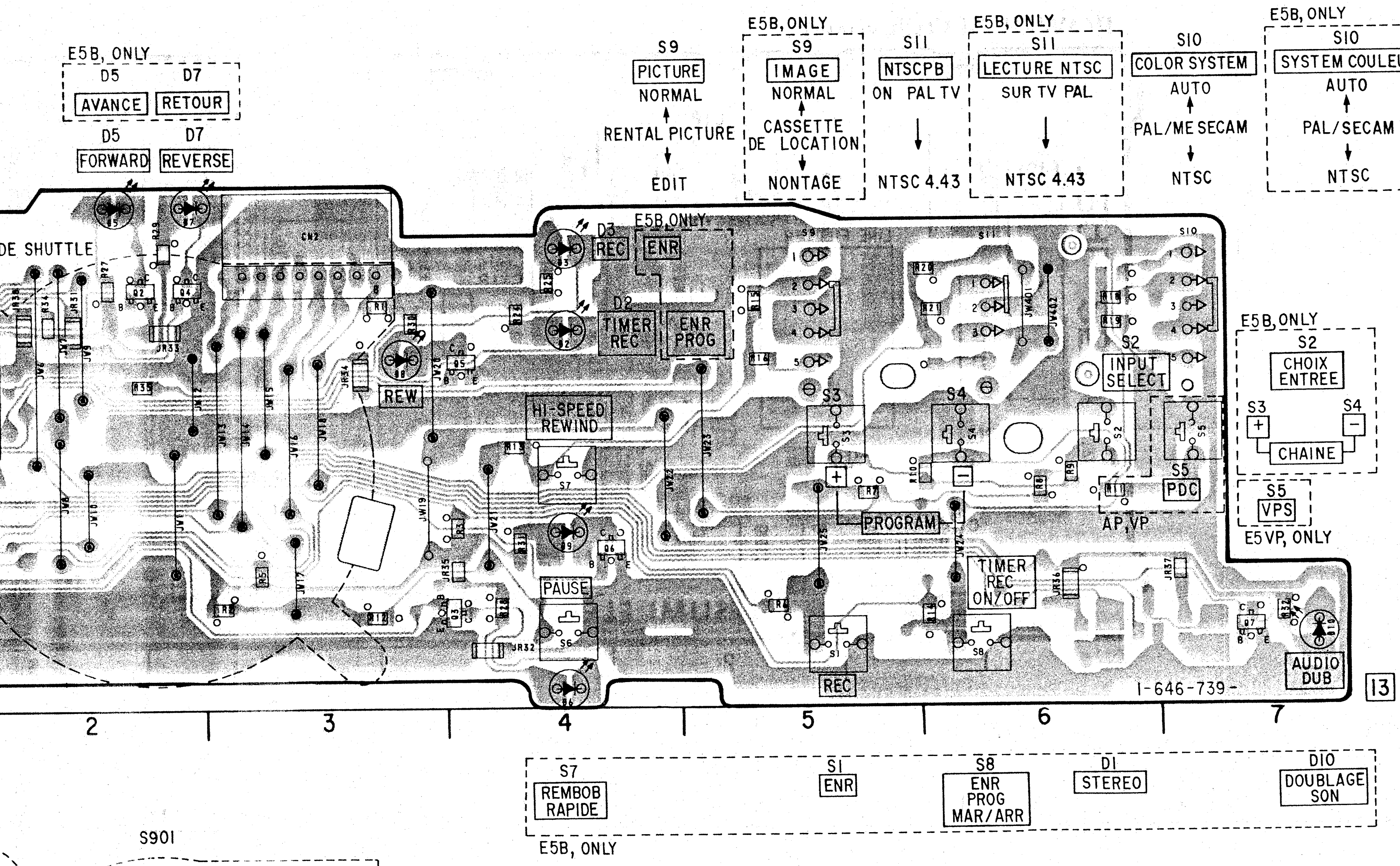

E5B, ONLY
D5
D7
AVANCE
RETOUR
D5
D7
FORWARD
REVERSE
MF-173 BOARD
S9
PICTURE
NORMAL
RENTAL PICTURE
EDIT
E5B, ONLY
S9
IMAGE
NORMAL
CASSETTE
DE LOCATION
NONTAGE
S11
NTSCPB
ON PAL TV
NTSC 4.43
E5B, ONLY
S11
LECTURE NTSC
SUR TV PAL
NTSC 4.43
OPC
DUAL MODE SHUTTLE
D3
REC
E5B ONLY
ENR
D2
TIMER
REC
ENR
PROG
FF
REW
HI-SPEED
REWIND
S3
S4
PROGRAM
PAUSE
TIMER
REC
ON/OFF
REC
A
B
1
2
3
4
5
6
S7
REMBOB
RAPIDE
S1
ENR
S8
ENR
PROG
MAR/ARR
D1
STEREO
E5B, ONLY


S901
FOWARD
REVERSE
6
PLAY
7
STOP
8
LECTURE
E5B, ONLY

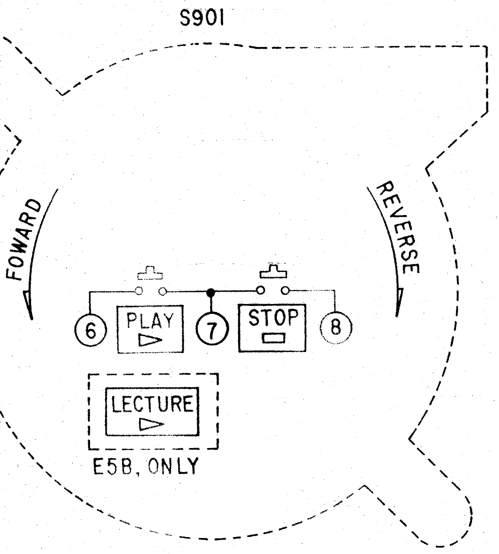

Drum Mo
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
MF-172
(Mode Contro

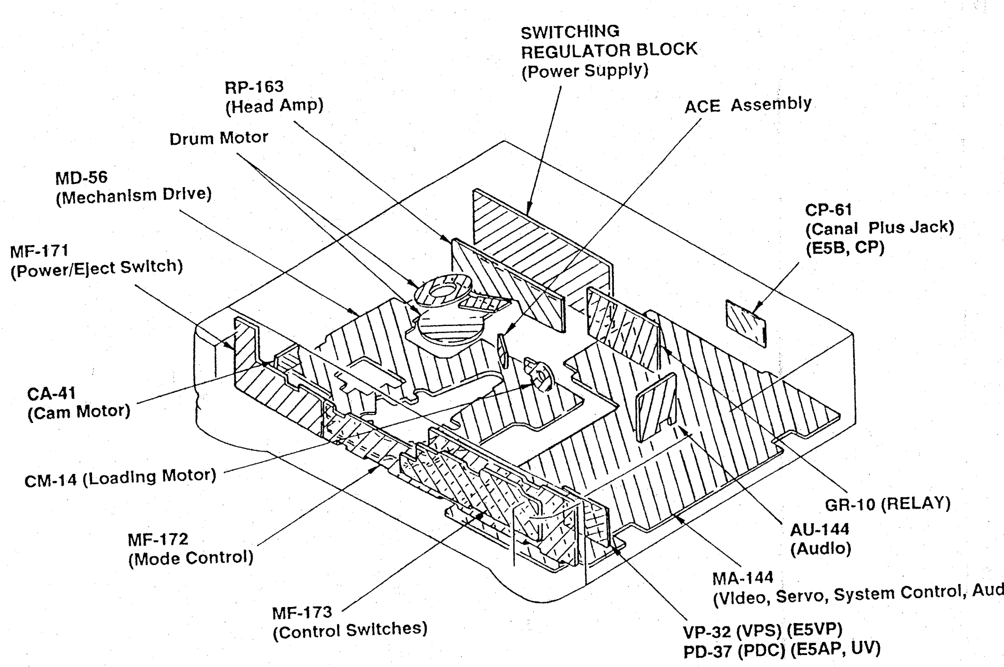

R101
JW102
JW131
R136
R116
C105
IC104
JW151
JW119
JW118
JW117
JW115
JW116
C103
JW101
JW120
B107
JW114
R128
JW112
JW111
FL101
JW110
JW109
JW108
JW107
JW106
C111
6
7
8
9
10
11

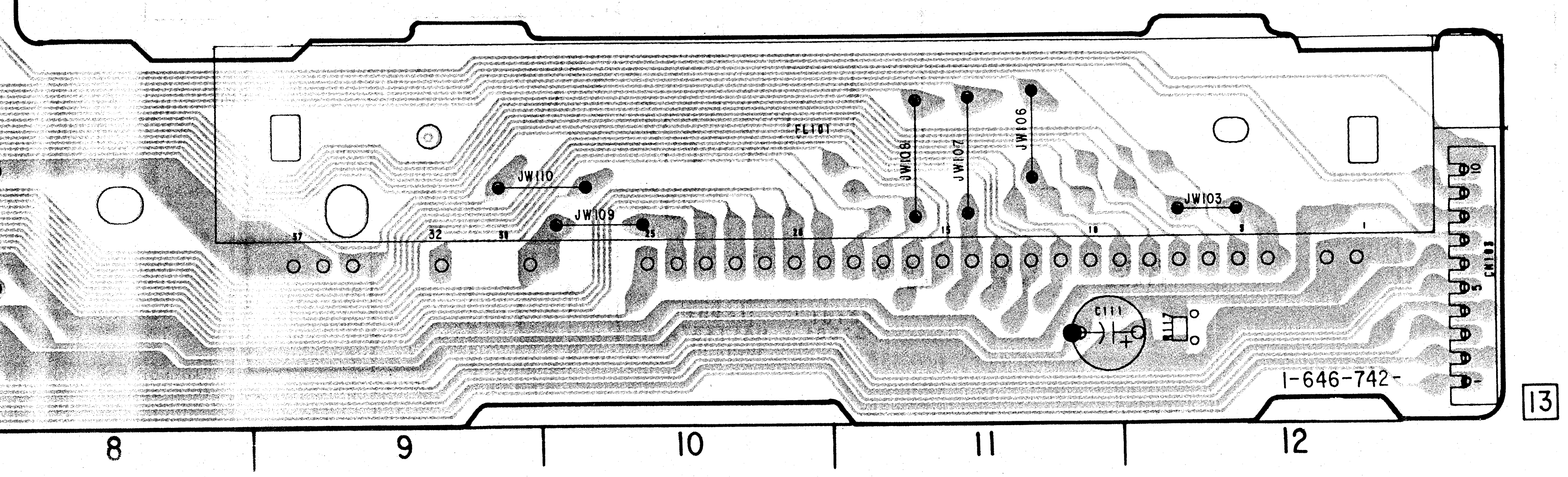
MODE CONTROL MODE CONTROL


E5B, ONLY
D5
D7
AVANCE
RETOUR
D5
D7
FORWARD
REVERSE
S9
PICTURE
NORMAL
RENTAL PICTURE
EDIT
E5B, ONLY
S9
IMAGE
NORMAL
CASSETTE DE LOCATION
NONTAGE
S11
NTSCPB
ON PAL TV
NTSC 4.43
E5B, ONLY
S11
LECTURE NTSC
SUR TV PAL
NTSC 4.43
S10
COLOR SYSTEM
AUTO
PAL/ME SECAM
NTSC
E5B, ONLY
S10
SYSTEM COULEUR
AUTO
PAL/SECAM
NTSC
E5NP, NC, UB, AE
S10
COLOR SYSTEM
AUTO
PAL
NTSC
DE SHUTTLE
D3
REC
E5B, ONLY
ENR
D2
TIMER REC
ENR PROG
REW
HI-SPEED REWIND
S3
S4
S2
INPUT SELECT
S5
PDC
AP, VP
PROGRAM
PAUSE
TIMER REC ON/OFF
REC
AUDIO DUB
1-646-739-
13
E5B, ONLY
S2
CHOIX ENTREE
S3
S4
CHAINE
S5
VPS
E5VP, ONLY
2
3
4
5
6
7
S7
REMBOB RAPIDE
S1
ENR
S8
ENR PROG MAR/ARR
D1
STEREO
D10
DOUBLAGE SON
E5B, ONLY

MF-173 BOA	
CN001	A-
CN002	A-
D001	B-
D002	A-
D003	A-
D004	A-
D005	A-
D006	B-
D007	A
D008	A-
D009	B-
D010	B-
D012	A-
Q001	A-
Q002	A-
Q003	A
Q004	B
Q005	A
Q006	B
Q007	B
Q009	B

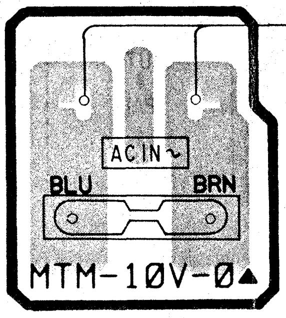

S901
FOWARD
REVERSE
6
PLAY
7
STOP
8
LECTURE
E5B, ONLY

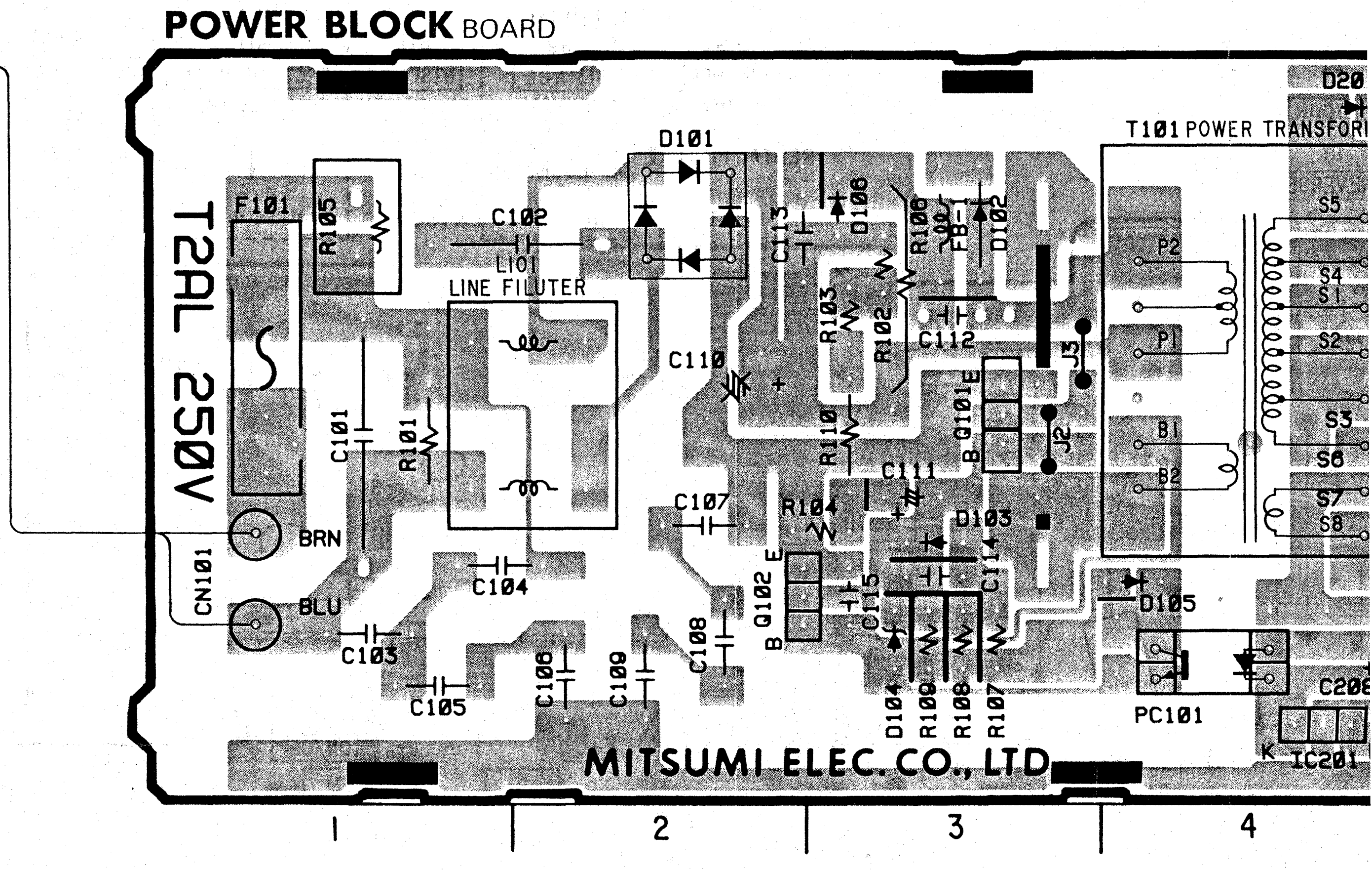

SWITCHING REGULATOR BLOCK (Power Supply)
RP-163 (Head Amp)
ACE Assembly
Drum Motor
MD-56 (Mechanism Drive)
CP-61 (Canal Plus Jack) (E5B, CP)
MF-171 (Power/Eject Switch)
CA-41 (Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
AU-144 (Audio)
MF-172 (Mode Control)
MA-144 (Video, Servo, System Control, Aud
MF-173 (Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)


FL101
JW110
JW109
JW108
JW107
JW106
JW103
C111
CN101
1-646-742-
13
8
9
10
11
12

POWER BLOCK PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

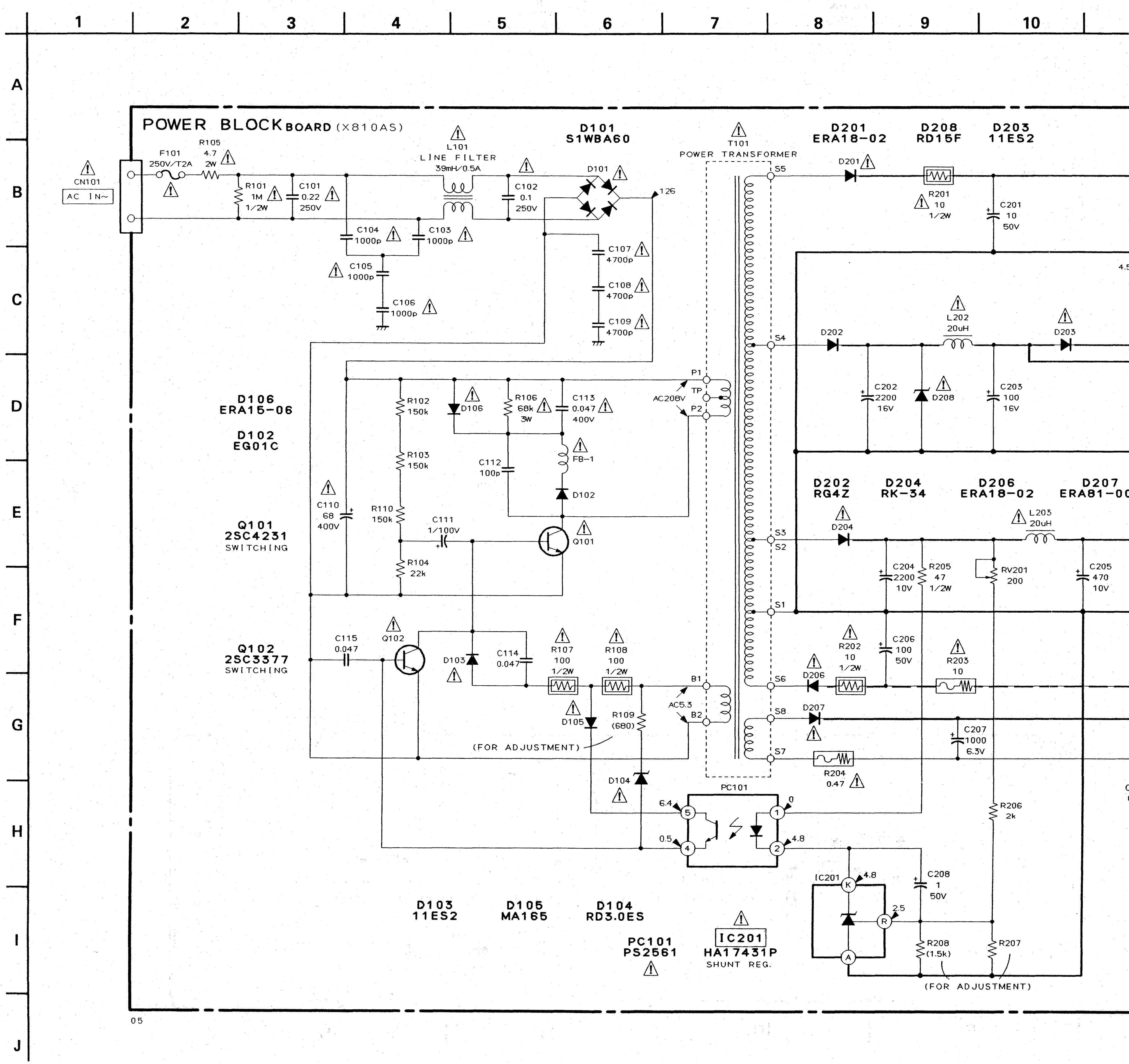
– Ref. No.: POWER BLOCK Board; 7,000 series –


AC IN~
BLU
BRN
MTM-10V-0▲


POWER BLOCK BOARD
T2AL 250V
F101
R105
C102
L101
LINE FILUTER
D101
C113
D106
R106
FB-1
D102
T101 POWER TRANSFORM
S5
S4
S1
S2
S3
S6
S7
S8
P2
P1
B1
B2
C110
R103
R102
C112
J3
J2
E
B
Q101
C101
R101
R110
C111
C107
R104
D103
BRN
BLU
CN101
C104
C103
C105
C106
C109
C108
Q102
C115
C114
D105
D104
R109
R108
R107
PC101
C208
K
IC201
MITSUMI ELEC. CO., LTD
D20
1
2
3
4

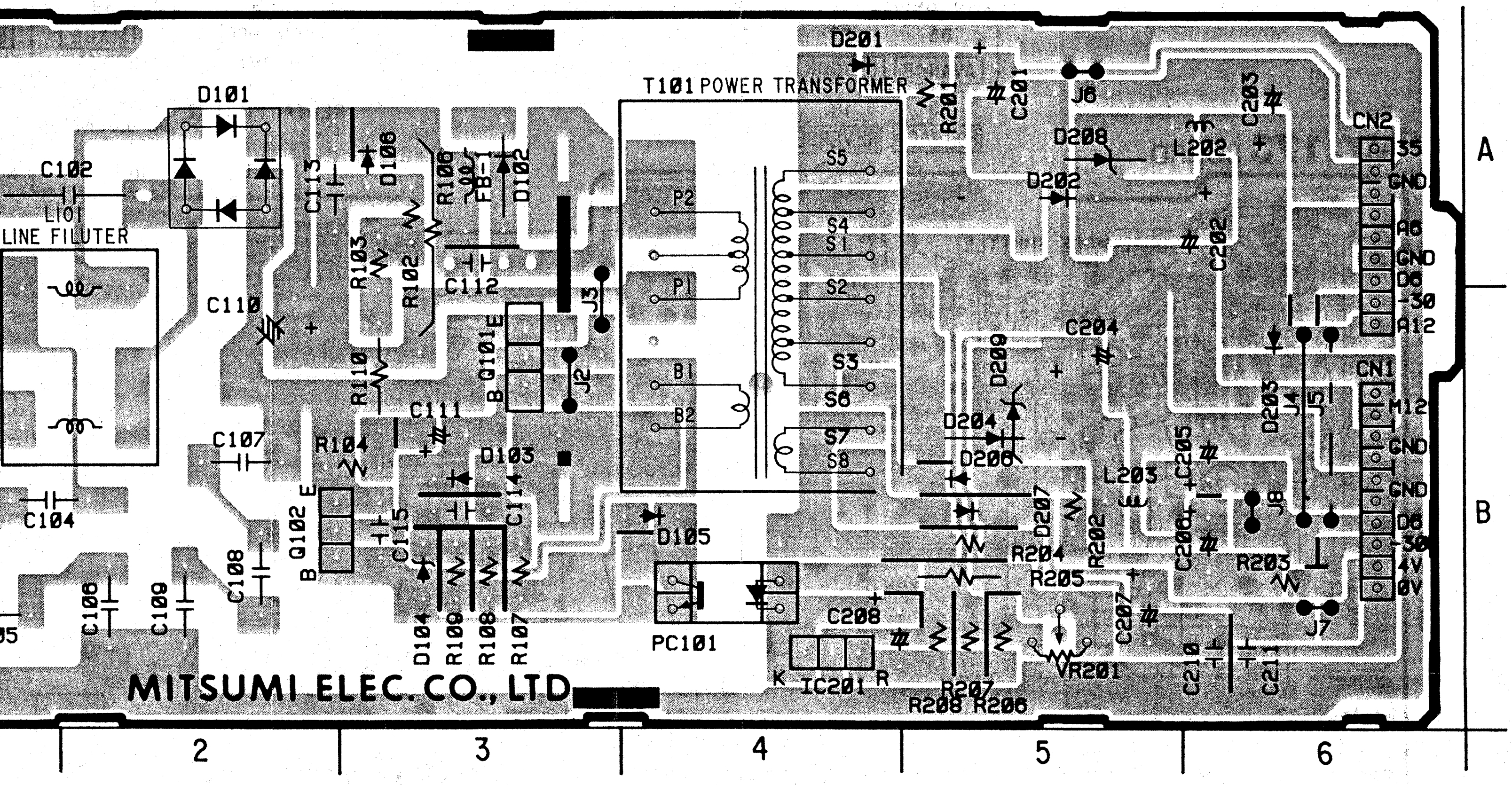
POWER BLOCK BOARD

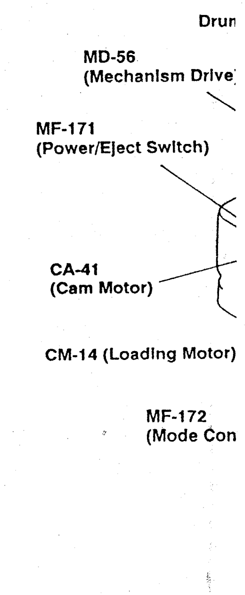
CN1	B-6
CN2	A-6
CN101	B-1
D101	A-2
D102	A-3
D103	B-3
D104	B-3
D105	B-4
D106	A-3
D201	A-4
D202	A-5
D203	B-6
D204	B-5
D206	B-5
D207	B-5
D208	A-5
IC201	B-4
Q101	B-3
Q102	B-2

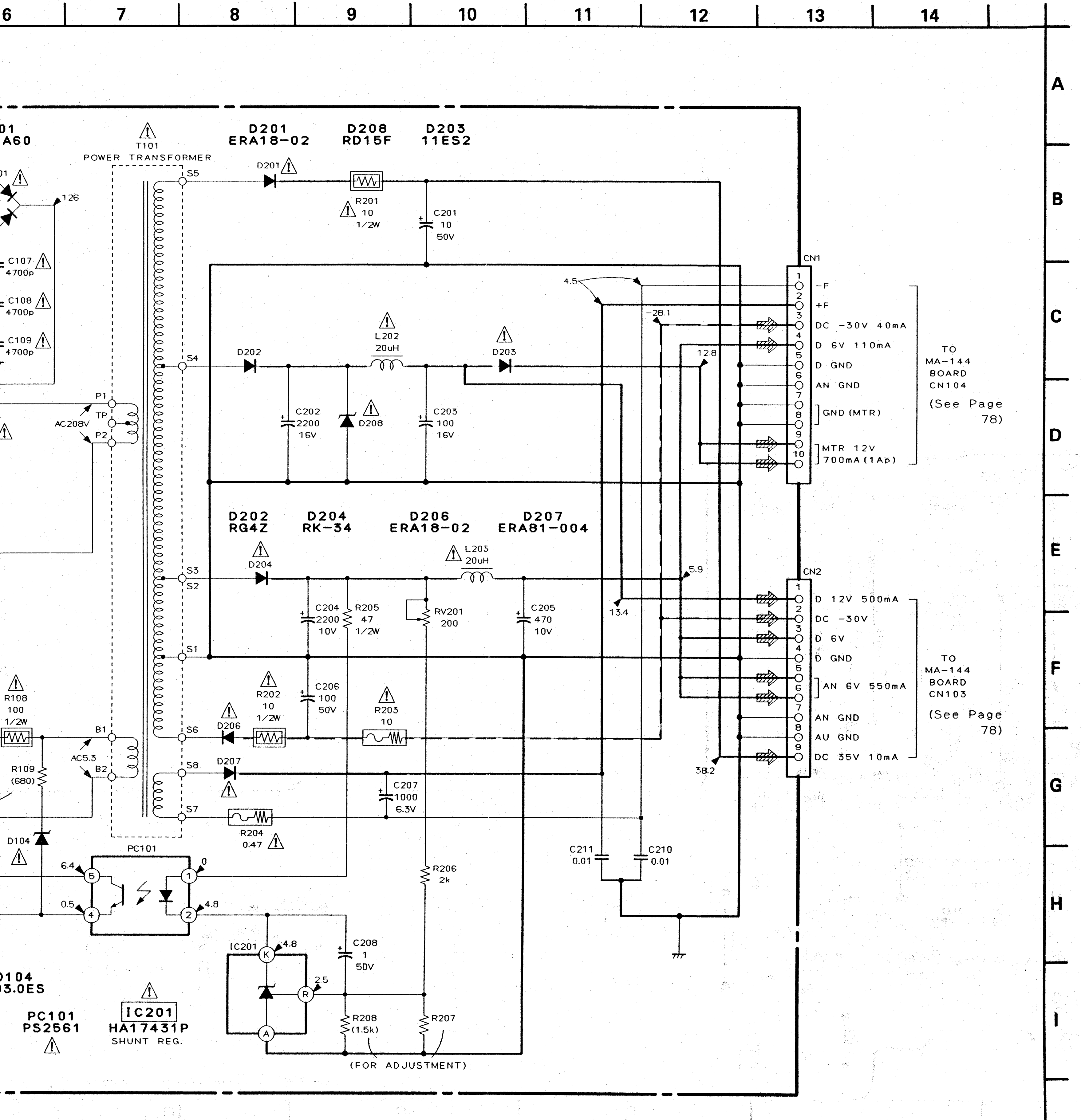

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
H
I
J
POWER BLOCK BOARD (X810AS)
CN101
AC IN~
F101
250V/T2A
R105
4.7
2W
R101
1M
1/2W
C101
0.22
250V
L101
LINE FILTER
39mH/0.5A
C102
0.1
250V
D101
S1WBA60
D101
126
C104
1000p
C103
1000p
C105
1000p
C106
1000p
C107
4700p
C108
4700p
C109
4700p
T101
POWER TRANSFORMER
S5
S4
S3
S2
S1
S6
S8
S7
P1
TP
P2
AC208V
B1
B2
AC5.3
D106
ERA15-06
D102
EG01C
Q101
2SC4231
SWITCHING
Q102
2SC3377
SWITCHING
R102
150k
R103
150k
D106
R106
68k
3W
C113
0.047
400V
C112
100p
FB-1
D102
C110
68
400V
R110
150k
C111
1/100V
R104
22k
Q101
C115
0.047
Q102
D103
C114
0.047
R107
100
1/2W
R108
100
1/2W
D105
R109
(680)
(FOR ADJUSTMENT)
D104
PC101
6.4
5
0.5
4
1
0
2
4.8
D103
11ES2
D105
MA165
D104
RD3.0ES
PC101
PS2561
IC201
HA17431P
SHUNT REG.
D201
ERA18-02
D208
RD15F
D203
11ES2
D201
R201
10
1/2W
C201
10
50V
D202
L202
20uH
D203
C202
2200
16V
D208
C203
100
16V
D202
RG4Z
D204
RK-34
D206
ERA18-02
D207
ERA81-00
D204
L203
20uH
C204
2200
10V
R205
47
1/2W
RV201
200
C205
470
10V
R202
10
1/2W
C206
100
50V
D206
R203
10
D207
C207
1000
6.3V
R204
0.47
R206
2k
IC201
K
R
A
4.8
2.5
C208
1
50V
R208
(1.5k)
R207
(FOR ADJUSTMENT)
05

POWER BLOCK POWER BLOCK

BOARD


D101
C102
L101
LINE FILUTER
C113
D106
R106
FB-1
D102
T101 POWER TRANSFORMER
D201
R201
C201
J6
D208
L202
C203
CN2
35
GND
A6
GND
D6
-30
A12
CN1
M12
GND
GND
D6
-30
4V
0V
R103
R102
C112
J3
C110
Q101
J2
R110
C111
D103
C107
R104
C104
Q102
C115
D105
C114
D104
R109
R108
R107
C106
C109
C108
P2
P1
B1
B2
S5
S4
S1
S2
S3
S6
S7
S8
D202
C202
C204
D209
D204
D206
D207
D203
J4
J5
L203
C205
R204
R205
R202
C206
R203
J8
C207
J7
C208
PC101
IC201
K
R
R207
R208
R206
RV201
C210
C211
MITSUMI ELEC. CO., LTD
A
B
2
3
4
5
6

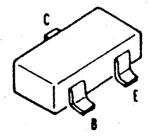

Drun
MD-56
(Mechanism Drive)
MF-171
(Power/Eject Switch)
CA-41
(Cam Motor)
CM-14 (Loading Motor)
MF-172
(Mode Con


6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
J
01
A60
T101
POWER TRANSFORMER
D201
ERA18-02
D208
RD15F
D203
11ES2
D201
R201
10
1/2W
C201
10
50V
126
C107
4700p
C108
4700p
C109
4700p
S5
S4
S3
S2
S1
S6
S8
S7
P1
TP
P2
AC208V
B1
B2
AC5.3
4.5
-28.1
12.8
L202
20uH
D202
D203
C202
2200
16V
D208
C203
100
16V
CN1
-F
+F
DC -30V 40mA
D 6V 110mA
D GND
AN GND
GND (MTR)
MTR 12V
700mA (1Ap)
TO
MA-144
BOARD
CN104
(See Page 78)
D202
RG4Z
D204
RK-34
D206
ERA18-02
D207
ERA81-004
L203
20uH
D204
C204
2200
10V
R205
47
1/2W
RV201
200
C205
470
10V
5.9
13.4
CN2
D 12V 500mA
DC -30V
D 6V
D GND
AN 6V 550mA
AN GND
AU GND
DC 35V 10mA
TO
MA-144
BOARD
CN103
(See Page 78)
R108
100
1/2W
R202
10
1/2W
D206
C206
100
50V
R203
10
R109
(680)
D207
C207
1000
6.3V
38.2
R204
0.47
D104
PC101
6.4
0.5
0
4.8
C211
0.01
C210
0.01
R206
2k
IC201
4.8
2.5
C208
1
50V
R208
(1.5k)
R207
(FOR ADJUSTMENT)
D104
03.0ES
PC101
PS2561
IC201
HA17431P
SHUNT REG.

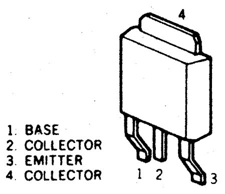
R BLOCK POWER BLOCK

4-3. SEMICONDUCTORS

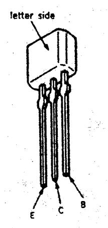
DTA144EK
UN211L
UN2113
UN2213
2SA1162
2SD601A-Q



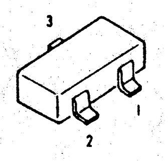
2SB1000A-L


4
1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR
1
2
3

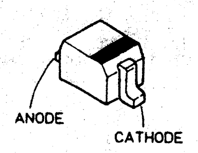
2SC2785-HFE

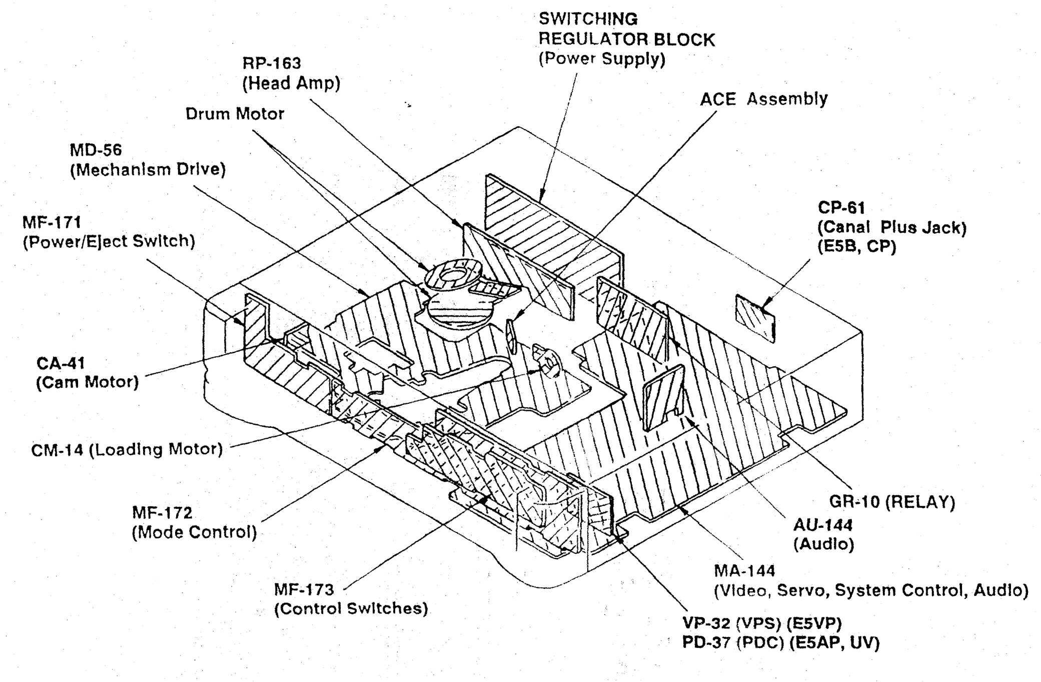

letter side
E
C
B

MA110



MA152WK

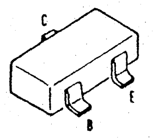

ANODE
CATHODE


SWITCHING REGULATOR BLOCK (Power Supply)
RP-163 (Head Amp)
Drum Motor
ACE Assembly
MD-56 (Mechanism Drive)
MF-171 (Power/Eject Switch)
CP-61 (Canal Plus Jack) (E5B, CP)
CA-41 (Cam Motor)
CM-14 (Loading Motor)
GR-10 (RELAY)
MF-172 (Mode Control)
AU-144 (Audio)
MA-144 (Video, Servo, System Control, Audio)
MF-173 (Control Switches)
VP-32 (VPS) (E5VP)
PD-37 (PDC) (E5AP, UV)

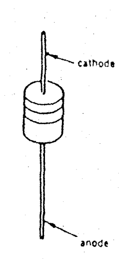
A
B
C
D
E
F
G
H
I
J

4-3. SEMICONDUCTORS

DTA144EK
UN211L
UN2113
UN2213
2SA1162
2SD601A-Q



RD13ES-B2
RD33ES-B2
RD4.3ES-B1
RD4.7ES-B2
RD6.8ES-B2
1SS119
11ES2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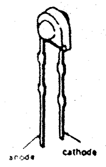
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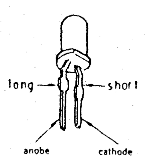
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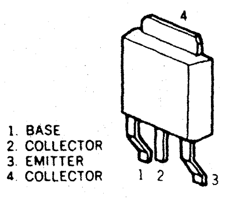
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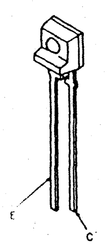

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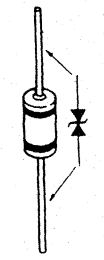

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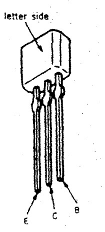
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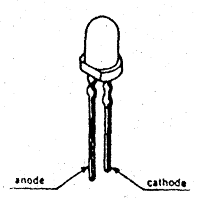
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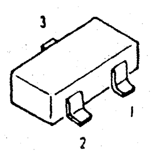

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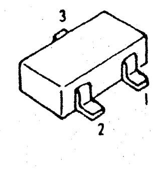

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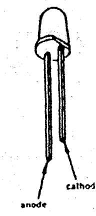
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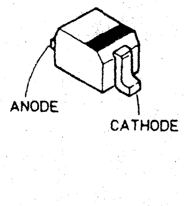
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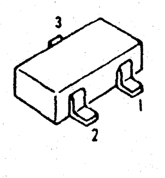

SLV-E5AE/AP/B/CP/EI/IT/VI
SLV-E6UV

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NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.

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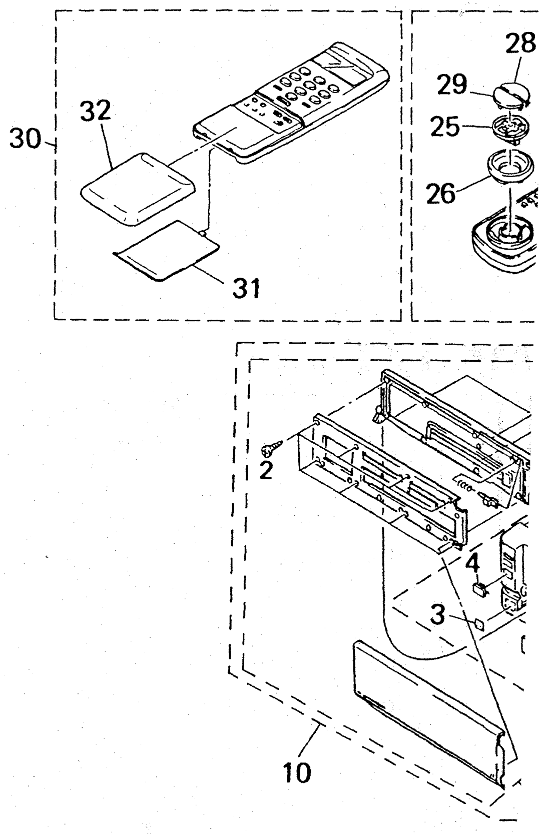
5-1. FRONT PANEL AND CABINET ASS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Ref. No.	Part No.	Description
1	X-3942-306-1	DOOR BLOCK ASSY (M), HALF (AE, EI, IT, VP)
1	X-3942-309-1	DOOR BLOCK ASSY (M), HALF
1	X-3942-310-1	DOOR BLOCK ASSY (M), HALF
1	X-3942-976-1	DOOR BLOCK ASSY (M), HALF
1	X-3942-978-1	DOOR BLOCK ASSY (M), HALF
2	4-908-792-31	SCREW (B2) (M2X4), TAPPIN(
* 3	3-703-713-41	STICKER, SONY SYMBOL (10)
4	3-946-620-01	FILTER, REMOTE CONTROL
5	3-951-087-01	PLATE, TRANSPARENT, PANEL
6	3-951-089-01	SPRING (GE), FL
7	3-951-086-41	DOOR, CASSETTE (AE, AP, CP,
7	3-951-086-51	DOOR, CASSETTE (B)
8	3-319-224-11	DAMPER, SMALL
9	3-951-080-01	PLATE (RIGHT), FULCRUM, D
10	X-3942-303-1	PANEL ASSY, FRONT (AE, EI,
10	X-3942-305-1	PANEL ASSY, FRONT (VP)
10	X-3942-311-1	PANEL ASSY, FRONT (B)
10	X-3942-313-1	PANEL ASSY, FRONT (CP)
10	X-3942-972-1	PANEL ASSY, FRONT (UV)
10	X-3942-975-1	PANEL ASSY, FRONT (AP)
11	X-3942-217-1	BUTTON ASSY, FUNCTION (AE, AP, CP, EI, IT, VP, UV)
11	X-3942-377-1	BUTTON ASSY, FUNCTION (B)
12	3-944-572-11	RING, SHUTTLE
13	3-951-093-01	INSULATOR
* 14	3-953-561-01	PLATE, BOTTOM
15	3-670-155-11	LEG
16	X-3942-304-1	PANEL SUB ASSY (AE, CP, EI
16	X-3942-308-1	PANEL SUB ASSY (VP)
16	X-3942-312-1	PANEL SUB ASSY (B)

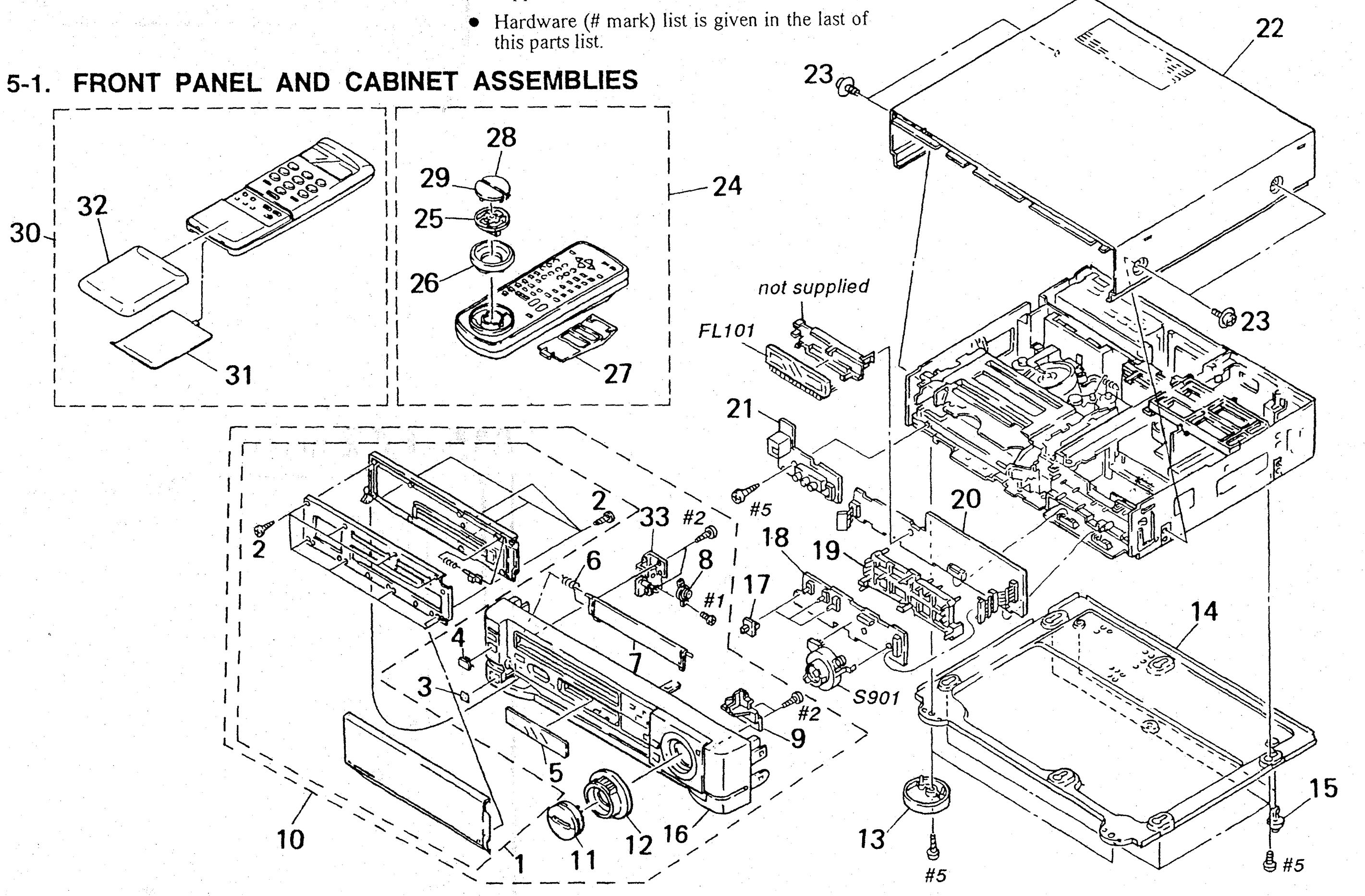
SECTION 5
EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

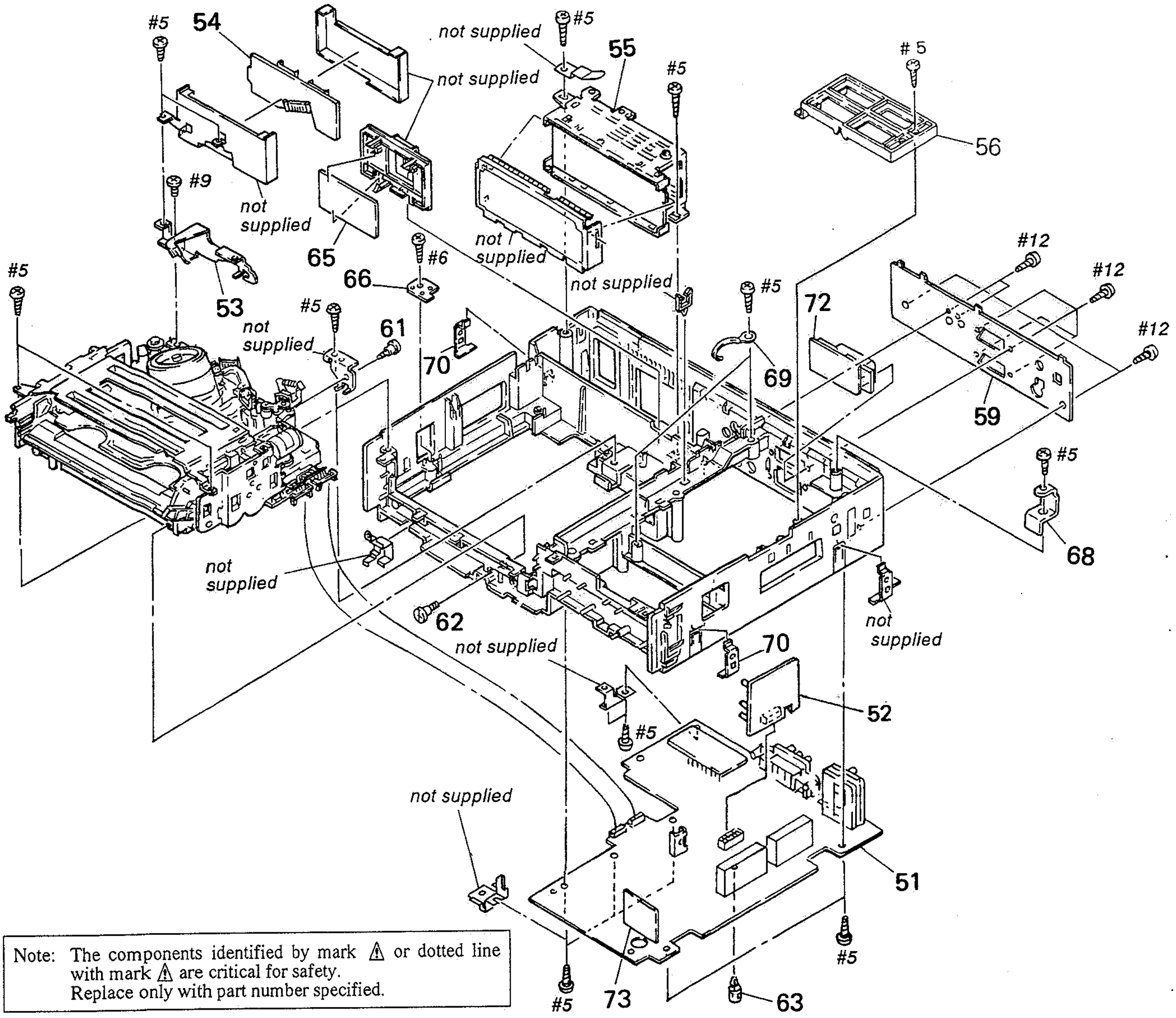
5-1. FRONT PANEL AND CABINET ASSEMBLIES



Ref. No.	Part No.	Description	Remark
1	X-3942-306-1	DOOR BLOCK ASSY (M), HALF (AE, EI, IT, VP)	
1	X-3942-309-1	DOOR BLOCK ASSY (M), HALF (CP)	
1	X-3942-310-1	DOOR BLOCK ASSY (M), HALF (B)	
1	X-3942-976-1	DOOR BLOCK ASSY (M), HALF (AP)	
1	X-3942-978-1	DOOR BLOCK ASSY (M), HALF (UV)	
2	4-908-792-31	SCREW (B2) (M2X4), TAPPING	
* 3	3-703-713-41	STICKER, SONY SYMBOL (10)	
4	3-946-620-01	FILTER, REMOTE CONTROL	
5	3-951-087-01	PLATE, TRANSPARENT, PANEL	
6	3-951-089-01	SPRING (GE), FL	
7	3-951-086-41	DOOR, CASSETTE (AE, AP, CP, EI, IT, VP, UV)	
7	3-951-086-51	DOOR, CASSETTE (B)	
8	3-319-224-11	DAMPER, SMALL	
9	3-951-080-01	PLATE (RIGHT), FULCRUM, DOOR	
10	X-3942-303-1	PANEL ASSY, FRONT (AE, EI, IT)	
10	X-3942-305-1	PANEL ASSY, FRONT (VP)	
10	X-3942-311-1	PANEL ASSY, FRONT (B)	
10	X-3942-313-1	PANEL ASSY, FRONT (CP)	
10	X-3942-972-1	PANEL ASSY, FRONT (UV)	
10	X-3942-975-1	PANEL ASSY, FRONT (AP)	
11	X-3942-217-1	BUTTON ASSY, FUNCTION (AE, AP, CP, EI, IT, VP, UV)	
11	X-3942-377-1	BUTTON ASSY, FUNCTION (B)	
12	3-944-572-11	RING, SHUTTLE	
13	3-951-093-01	INSULATOR	
* 14	3-953-561-01	PLATE, BOTTOM	
15	3-670-155-11	LEG	
16	X-3942-304-1	PANEL SUB ASSY (AE, CP, EI, IT)	
16	X-3942-308-1	PANEL SUB ASSY (VP)	
16	X-3942-312-1	PANEL SUB ASSY (B)	

Ref. No.	Part No.	Description	Remark
16	X-3942-974-1	PANEL SUB ASSY (AP, UV)	
17	3-744-217-01	KNOB, SELECTION	
* 18	A-6782-001-A	MF-173 BOARD, COMPLETE (AE, B, CP, EI, IT,)	
* 18	A-6782-015-A	MF-173 BOARD, COMPLETE (AP, VP, UV)	
19	3-951-084-01	HOLDER, MF	
* 20	A-6782-000-A	MF-172 BOARD, COMPLETE (AE, AP, IT)	
* 20	A-6782-008-A	MF-172 BOARD, COMPLETE (EI)	
* 20	A-6782-010-A	MF-172 BOARD, COMPLETE (B)	
* 20	A-6782-012-A	MF-172 BOARD, COMPLETE (CP)	
* 20	A-6782-014-A	MF-172 BOARD, COMPLETE (VP)	
* 20	A-6782-017-A	MF-172 BOARD, COMPLETE (UB, UV)	
* 21	A-6754-516-A	MF-171 BOARD, COMPLETE	
22	3-741-985-01	CASE, UPPER	
23	3-710-901-11	SCREW (TP3X8), CASE	
24	1-466-918-21	REMOTE COMMANDER (RMT-V131A) (AE, AP, CP, EI. IT, VP, UV)	
24	1-466-918-41	REMOTE COMMANDER (RMT-V131C) (B)	
25	3-941-619-11	HOLDER, DIAL	
26	3-951-746-01	RING, SHUTTLE	
27	3-943-535-01	COVER, BATTERY	
28	3-941-617-61	BUTTON, PLAYBACK	
29	3-941-618-51	BUTTON, STOP	
30	1-466-935-21	REMOTE COMMANDER (RMT-AG1) (UV)	
31	3-953-580-01	COVER, BATTERY	
32	3-953-581-01	COVER, SLIDE	
33	X-3942-319-1	PLATE (LEFT) BLOCK ASSY, FULCRUM	
FL101	1-517-132-11	INDICATOR TUBE, FLUORESCENT (AE, AP, CP, EI, IT, VP, UV)	
FL101	1-517-133-11	INDICATOR TUBE, FLUORESCENT (B)	
S901	1-572-662-11	SWITCH, ROTARY (DUAL MODE SHUTTLE)	

5-2. MAIN BOARD AND POWER BLOCK ASSEMBLIES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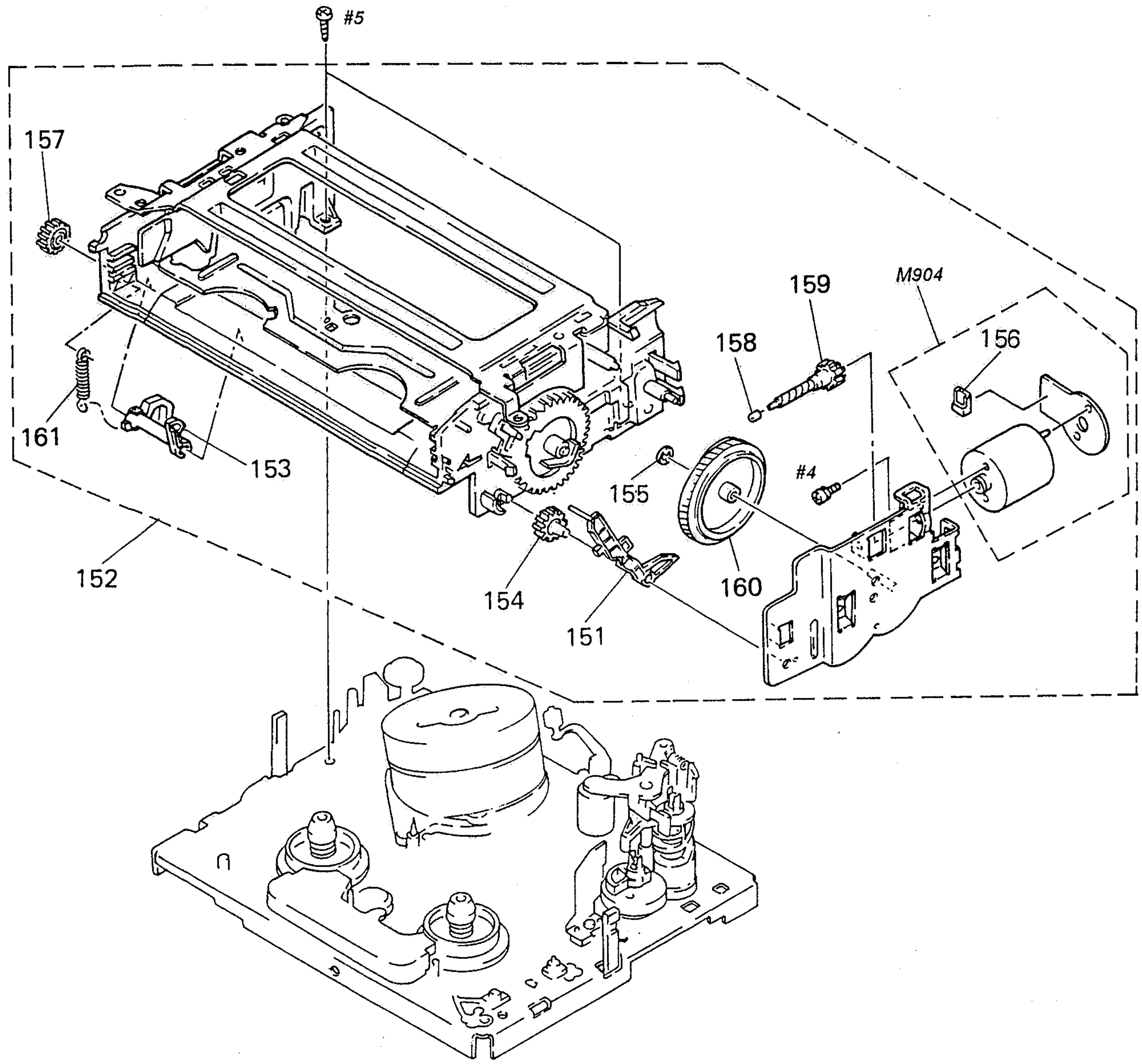
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 51	A-6756-999-A	MA-144 BOARD, COMPLETE (AE, IT)	
* 51	A-6782-007-A	MA-144 BOARD, COMPLETE (EI)	
* 51	A-6782-009-A	MA-144 BOARD, COMPLETE (B)	
* 51	A-6782-011-A	MA-144 BOARD, COMPLETE (CP)	
* 51	A-6782-013-A	MA-144 BOARD, COMPLETE (VP)	
* 51	A-6782-018-A	MA-144 BOARD, COMPLETE (UV)	
* 51	A-6782-019-A	MA-144 BOARD, COMPLETE (AP)	
* 52	A-6712-507-A	AU-144 BOARD, COMPLETE	
53	X-3746-004-1	GROUND ASSY, SHAFT	
* 54	A-6727-490-A	RP-163 BOARD, COMPLETE	
⚠55	1-413-789-11	POWER BLOCK (AE, AP, B, CP, EI, IT, VP)	
⚠55	1-413-790-11	POWER BLOCK (UV)	
56	3-951-118-01	HOLDER, FRAME	
* 59	3-946-836-71	PLATE, ORNAMENTAL, JACK (AE, AP, EI, IT, VP, UV)	
* 59	3-946-836-81	PLATE, ORNAMENTAL, JACK (CP)	
* 59	3-946-836-91	PLATE, ORNAMENTAL, JACK (B)	
61	3-736-055-01	SCREW (3X8), TAPPING	
62	3-741-948-01	SCREW (3), SPECIAL (+) TAPPING	
63	3-682-057-11	SPACER (SMALL)	
* 65	A-6756-998-A	GR-10 BOARD, COMPLETE	
66	3-749-677-01	RETAINER (LEFT), MD	
68	3-749-676-01	BRACKET, RF	
69	3-703-150-11	STOPPER, WIRING	
70	3-741-992-01	STOPPER, UPPER CASE	
* 72	1-646-744-13	CP-61 BOARD	
* 73	A-6754-476-A	VP-32 BOARD, COMPLETE (VP)	
* 73	A-6755-956-A	PD-37 BOARD, COMPLETE (AP, UV)	

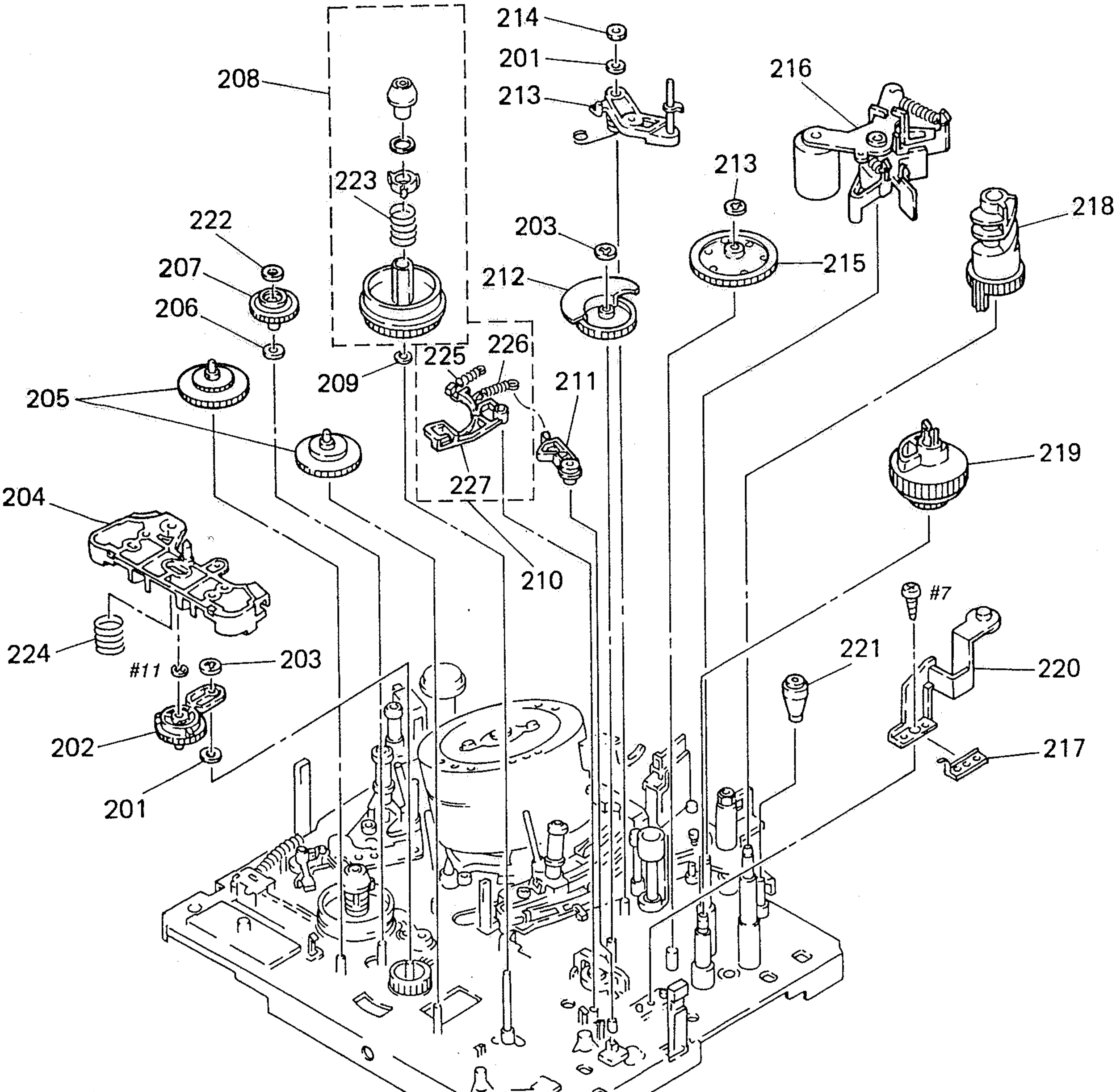
5-3. FL CASSETTE COMPARTMENT ASSEMBLY



Ref. No.	Part No.	Description	Remark
151	3-741-935-06	LEVER, FLAT DOOR	
152	A-6751-421-A	FL BLOCK ASSY (M2)	
153	3-736-163-01	LEVER, ERASING PROTECTION	
154	X-3727-775-2	GEAR (RIGHT) ASSY, MIDWAY	
155	3-696-510-01	WASHER (3), STOPPER	
156	1-506-482-11	PIN, CONNECTOR 3P	

Ref. No.	Part No.	Description	Remark
157	3-736-044-02	GEAR (LEFT), MIDWAY	
158	3-716-144-02	RETAINER, WORM	
159	3-736-100-01	GEAR (FL), WORM	
160	3-736-164-01	WHEEL (FL), WORM	
161	3-739-687-01	SPRING, TENSION	
M904	X-3727-784-1	MOTOR ASSY	

5-4. MECHANISM CHASSIS ASSEMBLY (1)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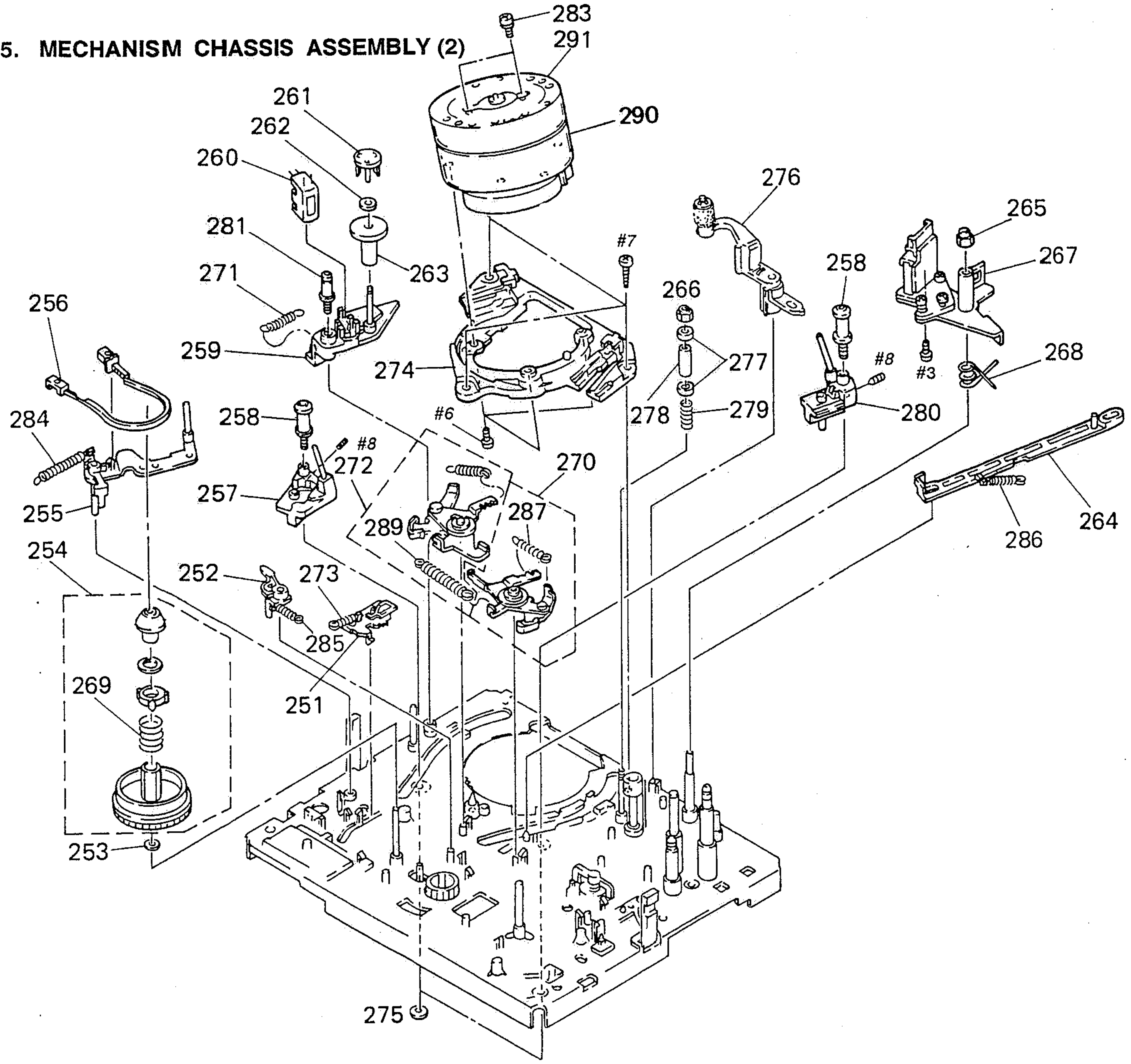
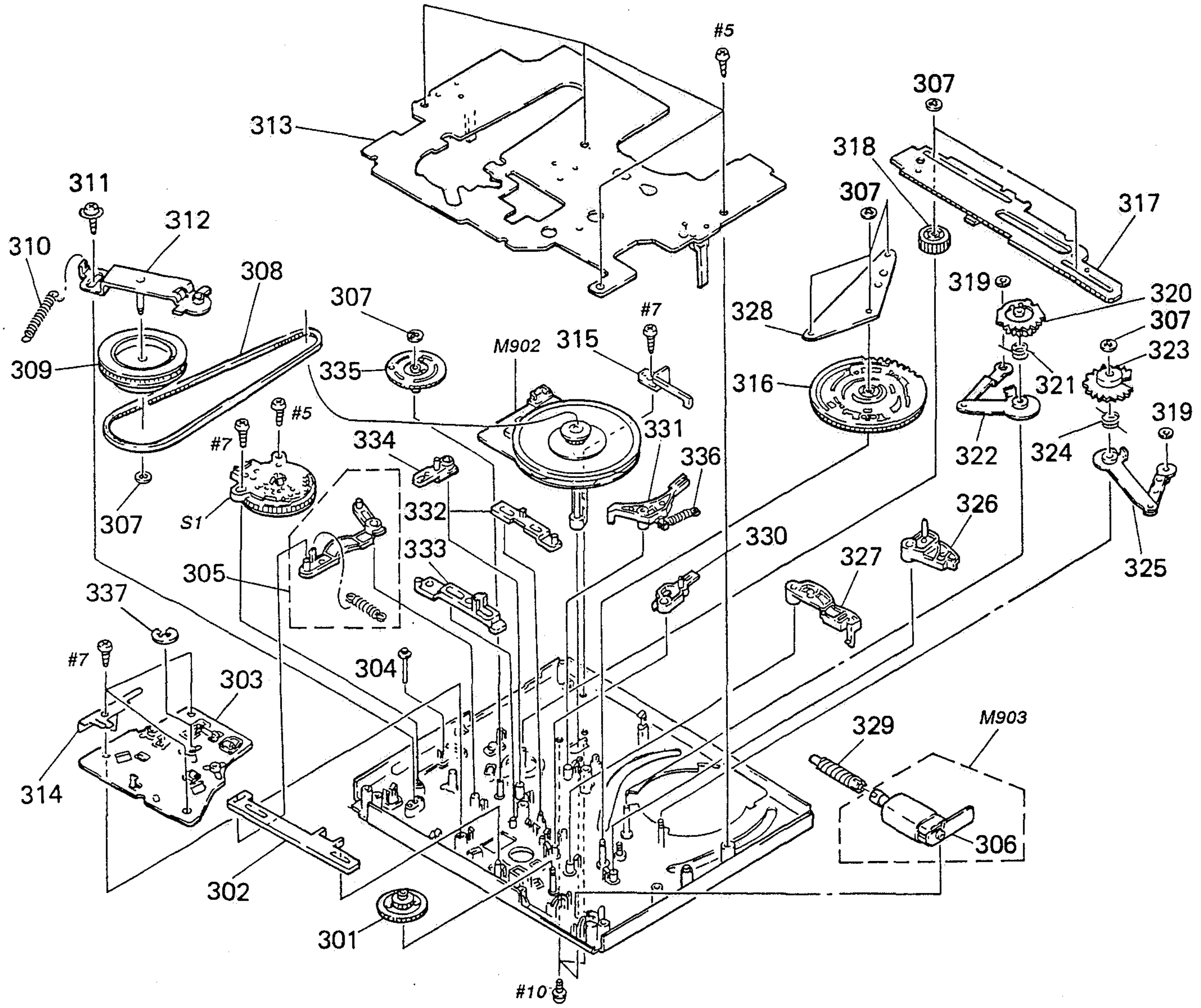
Ref. No.	Part No.	Description	Remark
201	3-701-438-11	WASHER, 2.5	
202	X-3727-776-1	ARM ASSY, PENDULUM	
203	3-669-595-00	WASHER (2), STOPPER	
204	3-736-172-02	RELEASE, LOCK, REEL	
205	X-3727-795-1	GEAR ASSY, RELAY	
206	3-736-074-01	RETAINER (SMALL), THRUST	
207	3-736-037-01	GEAR, REW	
208	X-3727-798-5	TABLE ASSY, REEL	
209	3-738-212-21	RETAINER, THRUST, REEL TABLE	
210	X-3733-335-1	BRAKE ASSY (AT), T SOFT	
211	3-736-105-01	ARM, REV BRAKE	
212	3-736-143-01	GEAR, RVS CAM	
213	X-3942-218-1	ARM ASSY, RVS	
214	3-736-740-01	NUT (M2X0.25), NYLON	
215	3-736-116-01	GEAR, COMMUNICATION	
216	X-3727-770-1	PINCH ROLLER BLOCK ASSY	
217	3-942-829-01	SPRING (2) (ATOM), GROUND, FL	
218	3-952-182-01	CAM, ELEVATOR	
219	3-943-700-01	GEAR (LO), PRESS CAM	
220	3-942-828-01	OPENNER, LID	
221	3-738-250-01	SCREW, AC ADJUSTMENT	
222	3-736-069-01	RETAINER, SPRING	
223	3-739-621-01	SPRING, COMPRESSION	
224	3-736-020-11	SPRING, COMPRESSION	
225	3-736-024-01	SPRING, TENSION	
226	3-736-025-01	SPRING (REV BRAKE), TENSION	
227	3-736-075-01	BRAKE, S SOFT	

5-5. MECHANISM CHASSIS ASSEMBLY (2)



Ref. No.	Part No.	Description	Remark
251	A-6759-483-A	TAKE-UP BLOCK ASSY (AT), S	
252	X-3727-773-1	ARM ASSY (S), S SOFT BRAKE	
253	3-738-212-21	RETAINER, THRUST, REEL TABLE	
254	X-3941-194-1	TABLE ASSY, REEL, S	
255	3-736-151-11	ARM (POM), TENSION REGULATOR	
256	X-3727-797-1	BAND ASSY, TENSION REGULATOR	
257	X-3727-786-1	SHUTTLE (LEFT) ASSY	
258	X-3733-301-1	ROLLER ASSY, GUIDE	
259	X-3942-452-1	STABILIZER (BASE) ASSY, B	
260	1-543-647-11	HEAD, FE	
261	3-736-082-01	RETAINER, TS THRUST	
262	3-741-925-01	RING, RETAINING	
263	X-3727-771-1	STABILIZER ASSY, TAPE	
264	X-3743-517-1	LEVER (S), RELEASE, C ROLLER	
265	3-942-867-01	NUT, AC HEIGHT ADJUSTMENT	
266	3-942-866-01	NUT (M3) (3X0.5), NYLON	
267	A-6761-129-A	HEAD BLOCK ASSY, ACE	
268	3-944-833-01	SPRING, TORSION	
269	3-739-621-01	SPRING, COMPRESSION	
270	X-3729-926-1	BRAKE ASSY (2), T	
271	3-736-745-01	SPRING	
272	X-3733-336-2	BRAKE ASSY (2) (AT), S	
273	3-738-284-01	SPRING, TENSION	
274	X-3746-005-1	BASE ASSY (G), DRUM	
275	3-736-073-01	SLIDER, POLYETHYLENE	
276	A-6747-267-A	ARM BLOCK ASSY (S), C ROLLER	
277	3-944-033-01	FLANGE, 7 GUIDE	
278	3-736-730-01	SLEEVE, #7 GUIDE	
279	3-749-099-01	SPRING (#7 GUIDE), COMPRESSION	
280	X-3727-787-1	SHUTTLE (RIGHT) ASSY	
281	X-3727-788-1	ROLLER ASSY, GUIDE, #2	
283	2-643-205-01	SCREW (PSW) 3X8	
284	3-733-389-11	SPRING, TENSION	
285	3-736-047-01	SPRING (S SOFT), TENSION	
286	3-736-735-03	SPRING, TENSION	
287	3-738-220-01	SPRING (MAIN BRAKE 2), TENSION	
289	3-738-221-01	SPRING (MAIN BRAKE 1), TENSION	
290	1-550-870-11	DRUM ASSY, ROTARY BOTTOM (DZL-59A-R)	
291	1-550-869-11	DRUM ASSY, ROTARY UPPER (DZR-59-R)	

5-6. MECHANISM CHASSIS ASSEMBLY (3)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Ref. No.	Part No.	Description	Remark
301	3-736-015-01	WHEEL (CAM), WORM	
302	3-736-158-01	PLATE, SLIDE, PENDULUM	
303	A-6739-084-A	CHASSIS BLOCK ASSY, SUB	
304	3-736-091-01	PIN, SWITCH	
305	X-3729-924-1	ARM ASSY, PENDULUM FUNCTION	
* 306	1-633-460-11	CA-41 BOARD	
307	3-669-595-00	WASHER (2), STOPPER	
308	3-736-013-01	BELT, TIMING	
309	X-3727-782-1	PULLEY ASSY	
310	3-736-089-01	SPRING, TENSION	
311	3-733-386-01	SCREW (3X8), WASHER	
312	X-3727-761-1	ARM ASSY, ADJUSTMENT	
* 313	A-6754-472-A	MD-56 BOARD, COMPLETE	
314	3-741-950-01	SPRING (AT), LEAF, SC GROUND	
315	3-736-744-01	RETAINER, ROTOR	
316	3-736-176-01	GEAR, CAM	
317	3-736-177-01	PLATE, SLIDE, MODE	
318	3-733-394-01	GEAR, RVS RELAY	
319	3-736-073-01	SLIDER, POLYETHYLENE	
320	3-736-148-01	GEAR (RIGHT), THREADING	
321	3-736-092-01	SPRING (RIGHT), TORSION	
322	X-3727-777-1	ARM (RIGHT) ASSY, THREADING	
323	3-736-147-01	GEAR (LEFT), THREADING	
324	3-736-040-01	SPRING (LEFT), TORSION	
325	X-3727-778-1	ARM (LEFT) ASSY, THREADING	
326	3-736-142-01	ARM, TENSION REGULATOR FUNCTION	
327	3-736-140-01	ARM, S TAKE-UP	
328	3-733-396-01	HOLDER, CAM GEAR	
329	3-733-395-01	GEAR (CAM), WORM	
330	3-733-397-01	ARM, BRAKE FUNCTION	
331	X-3733-338-1	BRAKE ASSY (AT), CAP	
332	3-733-398-01	PLATE, SLIDE, BRAKE	
333	3-736-103-01	PLATE, SLIDE, LIMITER	
334	3-736-016-01	ARM, LIMITER FUNCTION	
335	3-736-170-01	GEAR, RKB CAM	
336	3-738-237-01	SPRING (CAP BRAKE), TENSION	
337	3-669-465-00	WASHER (1.5), STOPPER	
M902	8-835-489-01	MOTOR, DC U-26K	
M903	X-3733-302-1	MOTOR ASSY, CAM	
S1	1-692-062-11	SWITCH, ROTARY	

AU-144

SECTION 6
ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-6712-507-A	AU-144 BOARD, COMPLETE			
		***********************			
		< CAPACITOR >			
C401	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C402	1-164-699-11	CERAMIC CHIP	0.0033uF	5%	50V
C403	1-124-902-00	ELECT	0.47uF	20%	50V
C404	1-124-907-11	ELECT	10uF	20%	50V
C405	1-137-370-11	FILM	0.01uF	5%	50V
C406	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C407	1-124-903-11	ELECT	1uF	20%	50V
C408	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C409	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C410	1-124-907-11	ELECT	10uF	20%	50V
C411	1-123-382-00	ELECT	3.3uF	20%	100V
C412	1-124-907-11	ELECT	10uF	20%	50V
C413	1-124-907-11	ELECT	10uF	20%	50V
C414	1-163-986-00	CERAMIC CHIP	0.027uF	10%	25V
C415	1-124-903-11	ELECT	1uF	20%	50V
C416	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V
C417	1-124-034-51	ELECT	33uF	20%	16V
C418	1-124-034-51	ELECT	33uF	20%	16V
		< CONNECTOR >			
CN410	1-695-938-11	CONNECTOR, BOARD TO BOARD 18P			
		< DIODE >			
D401	8-719-400-18	DIODE	MA152WK		
D402	8-719-404-46	DIODE	MA110		
		< IC >			
IC401	8-759-089-82	IC	BA7790LS		
IC402	8-759-513-05	IC	LVA521S		
		< JUMPER RESISTOR >			
JR401	1-216-296-00	METAL CHIP	0	5%	1/8W
JR402	1-216-296-00	METAL CHIP	0	5%	1/8W
JR403	1-216-296-00	METAL CHIP	0	5%	1/8W
		< COIL >			
L401	1-410-071-11	INDUCTOR	10mH		
L402	1-410-509-11	INDUCTOR	10uH		
		< RESISTOR >			
R401	1-216-097-00	METAL CHIP	100K	5%	1/10W
R402	1-216-091-00	METAL CHIP	56K	5%	1/10W
R403	1-216-033-00	METAL CHIP	220	5%	1/10W
R404	1-216-109-00	METAL CHIP	330K	5%	1/10W
R405	1-216-075-00	METAL CHIP	12K	5%	1/10W
R406	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R407	1-216-085-00	METAL CHIP	33K	5%	1/10W
R408	1-216-083-00	METAL CHIP	27K	5%	1/10W
R409	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R410	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R411	1-216-091-00	METAL CHIP	56K	5%	1/10W
R414	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R415	1-216-089-00	METAL CHIP	47K	5%	1/10W
R416	1-216-068-00	METAL CHIP	6200	5%	1/10W
R417	1-216-085-00	METAL CHIP	33K	5%	1/10W
R418	1-216-049-00	METAL CHIP	1K	5%	1/10W
R419	1-216-082-00	METAL GLAZE	24K	5%	1/10W
R420	1-216-035-00	METAL CHIP	270	5%	1/10W
R421	1-216-049-00	METAL CHIP	1K	5%	1/10W
R422	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R423	1-216-089-00	METAL CHIP	47K	5%	1/10W
R424	1-216-085-00	METAL CHIP	33K	5%	1/10W
R425	1-216-083-00	METAL CHIP	27K	5%	1/10W
R426	1-216-083-00	METAL CHIP	27K	5%	1/10W
R490	1-219-099-00	CHIP RESISTOR	120K	5%	1/4W

Ref. No.	Part No.	Description			Remark
		**			
*	1-646-744-13	CP-61 BOARD (CP,B)			
		******************			
		< CONNECTOR >			
* CN251	1-691-620-21	SOCKET, CONNECTOR 8P			
* CN252	1-691-621-11	SOCKET, CONNECTOR 9P			
CNJ251	1-561-534-41	SOCKET, PIN 21P			
		< JUMPER RESISTOR >			
JR251	1-216-295-00	METAL CHIP	0	5%	1/10W
JR252	1-216-295-00	METAL CHIP	0	5%	1/10W
		**			
*	A-6756-998-A	GR-10 BOARD, COMPLETE			
		**********************			
		< CAPACITOR >			
C101	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C107	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C108	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C110	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C133	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C137	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C138	1-124-589-11	ELECT	47uF	20%	16V
C139	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C143	1-165-319-11	CERAMIC CHIP	0.1uF		50V
		< CONNECTOR >			
CN101	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P			
CN102	1-506-490-21	PIN, CONNECTOR 11P			
* CN103	1-564-018-51	PIN, CONNECTOR 8P			
		< IC >			
IC103	8-759-097-80	IC HD49783FP-T1			
		< JUMPER RESISTOR >			
JR101	1-216-296-00	METAL CHIP	0	5%	1/8W
JR102	1-216-295-00	METAL CHIP	0	5%	1/10W
		< COIL >			
L114	1-410-521-11	INDUCTOR 100uH			
		< TRANSISTOR >			
Q102	8-729-424-18	TRANSISTOR UN2113			
Q120	8-729-422-27	TRANSISTOR 2SD601A-Q			
Q121	8-729-422-27	TRANSISTOR 2SD601A-Q			
Q126	8-729-424-18	TRANSISTOR UN2113			
Q127	8-729-421-19	TRANSISTOR UN2213			
Q139	8-729-421-19	TRANSISTOR UN2213			
		< RESISTOR >			
R102	1-216-073-00	METAL CHIP	10K	5%	1/10W
R103	1-216-295-00	METAL CHIP	0	5%	1/10W
R104	1-216-049-00	METAL CHIP	1K	5%	1/10W
R105	1-216-049-00	METAL CHIP	1K	5%	1/10W
R106	1-216-049-00	METAL CHIP	1K	5%	1/10W
R107	1-216-049-00	METAL CHIP	1K	5%	1/10W
R108	1-216-049-00	METAL CHIP	1K	5%	1/10W
R147	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R148	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R149	1-216-045-00	METAL CHIP	680	5%	1/10W
R150	1-216-043-00	METAL CHIP	560	5%	1/10W
R151	1-216-049-00	METAL CHIP	1K	5%	1/10W
R152	1-216-049-00	METAL CHIP	1K	5%	1/10W
R153	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R154	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R155	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R156	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R157	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R158	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R159	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R160	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R162	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R165	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R166	1-216-083-00	METAL CHIP	27K	5%	1/10W
		**			
*	A-6756-999-A	MA-144 BOARD, COMPLETE (AE, IT)			
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*	A-6782-007-A	MA-144 BOARD, COMPLETE (EI)			
		***************************			
*	A-6782-009-A	MA-144 BOARD, COMPLETE (B)			
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*	A-6782-011-A	MA-144 BOARD, COMPLETE (CP)			
		****************************			
	A-6782-013-A	MA-144 BOARD, COMPLETE (VP)			
		****************************			
*	A-6782-018-A	MA-144 BOARD, COMPLETE (UV)			
		****************************			
*	A-6782-019-A	MA-144 BOARD, COMPLETE (AP)			
		****************************			
	1-558-924-21	CABLE, PIN			
	3-951-893-01	HEAT SINK			
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3			
		< CAPACITOR >			
C101	1-163-031-11	CERAMIC CHIP	0.01uF		50V

MA-144

Ref. No.	Part No.	Description			Remark
C102	1-124-589-11	ELECT	47uF	20%	16V
C103	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C104	1-124-916-11	ELECT	22uF	20%	63V
C105	1-124-443-00	ELECT	100uF	20%	6.3V
C106	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C107	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C108	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C109	1-124-925-11	ELECT	2.2uF	20%	100V
C111	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C112	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C113	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C114	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C115	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C116	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C117	1-124-925-11	ELECT	2.2uF	20%	100V
C118	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C119	1-124-916-11	ELECT	22uF	20%	63V
C131	1-124-477-11	ELECT	47uF	20%	25V
C132	1-124-584-00	ELECT	100uF	20%	10V
C135	1-124-477-11	ELECT	47uF	20%	25V
C136	1-126-101-11	ELECT	100uF	20%	16V
C140	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C141	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C142	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C143	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C145	1-162-306-11	CERAMIC	0.01uF	20%	16V (VP)
C201	1-162-306-11	CERAMIC	0.01uF	20%	16V
C203	1-126-101-11	ELECT	100uF	20%	16V
C204	1-130-495-00	MYLAR	0.1uF	5%	50V
C205	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C206	1-124-916-11	ELECT	22uF	20%	63V
C207	1-130-487-00	MYLAR	0.022uF	5%	50V
C208	1-124-925-11	ELECT	2.2uF	20%	100V
C209	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C210	1-124-443-00	ELECT	100uF	20%	6.3V
C211	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C212	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C213	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C214	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C215	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C304	1-163-105-00	CERAMIC CHIP (B, VP)	33PF	5%	50V
C305	1-163-107-00	CERAMIC CHIP (B, VP)	39PF	5%	50V
C306	1-124-126-00	ELECT	47uF	20%	10V
C307	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C308	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C309	1-124-126-00	ELECT	47uF	20%	10V
C310	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C311	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C312	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C313	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C316	1-124-925-11	ELECT	2.2uF	20%	100V
C317	1-164-343-11	CERAMIC CHIP	0.056uF	10%	25V
C318	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C319	1-124-126-00	ELECT	47uF	20%	10V
C320	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C321	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C322	1-124-903-11	ELECT	1uF	20%	50V
C323	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C324	1-124-126-00	ELECT	47uF	20%	10V
C325	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C326	1-124-126-00	ELECT	47uF	20%	10V
C327	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C340	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C504	1-163-121-00	CERAMIC CHIP (B, CP)	150PF	5%	50V
C506	1-163-121-00	CERAMIC CHIP (B, CP)	150PF	5%	50V
C508	1-163-009-11	CERAMIC CHIP (B, CP)	0.001uF	10%	50V
C510	1-163-009-11	CERAMIC CHIP (B, CP)	0.001uF	10%	50V
C516	1-124-126-00	ELECT (B, CP)	47uF	20%	10V
C518	1-124-126-00	ELECT (B, CP)	47uF	20%	10V
C601	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C602	1-163-125-00	CERAMIC CHIP (B, VP)	220PF	5%	50V
C603	1-163-117-00	CERAMIC CHIP (B, VP)	100PF	5%	50V
C603	1-163-129-00	CERAMIC CHIP (AE, AP, CP, EI, IT, UV)	330PF	5%	50V
C604	1-124-589-11	ELECT	47uF	20%	16V
C605	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C606	1-162-306-11	CERAMIC	0.01uF	20%	16V
C607	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
C609	1-162-306-11	CERAMIC	0.01uF	20%	16V
C610	1-124-589-11	ELECT	47uF	20%	16V
C612	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C613	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C614	1-124-589-11	ELECT	47uF	20%	16V
C615	1-163-033-00	CERAMIC CHIP	0.022uF		50V (B)
C616	1-163-129-00	CERAMIC CHIP	330PF	5%	50V (B)
C617	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C618	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C619	1-163-113-00	CERAMIC CHIP	68PF	5%	50V

Ref. No.	Part No.	Description			Remark
C620	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C621	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C623	1-124-126-00	ELECT	47uF	20%	10V
C624	1-124-589-11	ELECT	47uF	20%	16V (B)
C625	1-124-589-11	ELECT	47uF	20%	16V (B)
C626	1-124-907-11	ELECT	10uF	20%	50V
C627	1-124-126-00	ELECT	47uF	20%	10V
C628	1-124-126-00	ELECT (B, VP)	47uF	20%	10V
C629	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C630	1-163-091-00	CERAMIC CHIP	8PF		50V
C651	1-124-907-11	ELECT	10uF	20%	50V
C652	1-124-907-11	ELECT	10uF	20%	50V
C653	1-124-907-11	ELECT	10uF	20%	50V
C654	1-163-031-11	CERAMIC CHIP (AE, AP, B, CP, EI, IT, UV)	0.01uF		50V
C660	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C690	1-164-066-11	CERAMIC	68PF	5%	50V (VP)
C701	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C702	1-124-126-00	ELECT	47uF	20%	10V
C703	1-124-472-11	ELECT (B, CP, EI, VP, UV)	470uF	20%	10V
C704	1-124-126-00	ELECT	47uF	20%	10V
C705	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C709	1-163-205-00	CERAMIC CHIP	0.001uF	5%	50V (VP)
C711	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C714	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C716	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C801	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VP)
C802	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VP)
C803	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VP)
C804	1-124-916-11	ELECT	22uF	20%	63V
C805	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VP)
C806	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VP)
C808	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C809	1-126-101-11	ELECT	100uF	20%	16V
C810	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C811	1-124-927-11	ELECT	4.7uF	20%	100V
C812	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C813	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C814	1-124-126-00	ELECT	47uF	20%	10V
C817	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C819	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C820	1-124-126-00	ELECT	47uF	20%	10V
C821	1-162-209-31	CERAMIC (EI, UV)	27PF	5%	50V

Ref. No.	Part No.	Description			Remark
C821	1-162-213-31	CERAMIC (AE, AP, CP, IT, VP)	39PF	5%	50V
C822	1-163-237-11	CERAMIC CHIP (UV)	27PF	5%	50V
C822	1-163-239-11	CERAMIC CHIP (AE, AP, CP, IT, VP)	33PF	5%	50V
C822	1-163-243-11	CERAMIC CHIP	47PF	5%	50V (EI)
C826	1-124-907-11	ELECT	10uF	20%	50V
C852	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C853	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C854	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C855	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C856	1-137-612-11	FILM	0.0068uF		100V
C857	1-104-697-11	FILM	0.047uF	5%	100V
C858	1-104-695-11	FILM	330PF	5%	100V
C859	1-124-477-11	ELECT	47uF	20%	16V
C860	1-124-477-11	ELECT	47uF	20%	16V
		< CONNECTOR >			
CJ701	1-695-935-11	CONNECTOR (SQUARE TYPE) 21P			
* CN032	1-565-439-11	PIN, CONNECTOR (PCB) 10P (AP, UV)			
CN101	1-506-468-11	PIN, CONNECTOR 3P			
CN103	1-568-786-11	PIN, CONNECTOR 9P			
CN104	1-568-787-11	PIN, CONNECTOR 10P			
CN201	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P			
CN202	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P			
CN401	1-691-702-11	CONNECTOR, BOARD TO BOARD 20P			
CN402	1-691-702-11	CONNECTOR, BOARD TO BOARD 20P			
* CN501	1-691-908-11	CONNECTOR, WIRE TRAP 8P (B, CP)			
* CN502	1-695-520-11	CONNECTOR, WIRE TRAP 9P (B, CP)			
CN601	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P			
CN853	1-695-939-11	CONNECTOR, BOARD TO BOARD 18P			
* CN854	1-560-892-00	PIN, CONNECTOR 4P			
* CN855	1-560-891-00	PIN, CONNECTOR 3P			
* CN857	1-560-892-00	PIN, CONNECTOR 4P			
		< DIODE >			
⚠D101	8-719-200-76	DIODE	10E1N		
⚠D102	8-719-200-76	DIODE	10E1N		
D103	8-719-911-19	DIODE	1SS119		
D104	8-719-911-19	DIODE	1SS119		
D131	8-719-801-48	DIODE	1SS193		
D201	8-719-108-24	DIODE	1SS223		
D202	8-719-109-74	DIODE	RD4.3ES-B1		
D203	8-719-109-81	DIODE	RD4.7ES-B2		
D204	8-719-200-82	DIODE	11ES2		
D206	8-719-801-48	DIODE	1SS193		
D207	8-719-108-24	DIODE	1SS223		

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

MA-144

Ref. No.	Part No.	Description	Remark
D301	8-719-200-82	DIODE 11ES2	
D302	8-719-801-48	DIODE 1SS193	
D501	8-719-109-96	DIODE RD6.8ES-B1 (B, CP)	
D502	8-719-109-96	DIODE RD6.8ES-B1 (B, CP)	
D503	8-719-109-96	DIODE RD6.8ES-B1 (B, CP)	
D505	8-719-109-96	DIODE RD6.8ES-B1 (B, CP)	
D506	8-719-110-36	DIODE RD13ES-B2 (B, CP)	
D601	8-719-400-18	DIODE MA152WK (B)	
D602	8-719-911-19	DIODE 1SS119 (B)	
D603	8-719-911-19	DIODE 1SS119 (VP)	
D604	8-719-911-19	DIODE 1SS119	
D605	8-719-911-19	DIODE 1SS119	
D701	8-719-109-96	DIODE RD6.8ES-B1	
D702	8-719-109-96	DIODE RD6.8ES-B1	
D704	8-719-109-96	DIODE RD6.8ES-B1 (B, CP)	
D703	8-719-108-12	DIODE RD9.1E-W	
D705	8-719-110-36	DIODE RD13ES-B2	
D706	8-719-109-74	DIODE RD4.3ES-B1	
D707	8-719-109-96	DIODE RD6.8ES-B1	
D708	8-719-109-96	DIODE RD6.8ES-B1	
D709	8-719-109-96	DIODE RD6.8ES-B1	
D710	8-719-109-96	DIODE RD6.8ES-B1	
D801	8-719-110-78	DIODE RD33ES-B2	
D802	8-719-800-76	DIODE 1SS226	
D899	8-719-911-19	DIODE 1SS119	

< DELAY LINE >

Ref. No.	Part No.	Description	Remark
DL601	1-415-728-31	DELAY LINE, 2H (ULTRASONIC)	
DL602	1-415-856-11	DELAY LINE, ULTRASONIC GLASS	

< IC >

Ref. No.	Part No.	Description	Remark
IC101	8-759-246-14	IC TA8823N	
⚠IC131	8-759-513-73	IC PQ09RF11	
⚠IC132	8-759-513-72	IC PQ12RF11	
IC201	8-759-983-45	IC BA6238A	
IC202	8-759-981-48	IC RC082M2G2	
IC203	8-752-844-32	IC CXP80724-VSX1800G	
IC204	8-759-970-89	IC BA10358F	
IC301	8-759-089-79	IC MB90085PF-129	
IC302	8-759-164-09	IC LA7218M-DE-R	
IC501	1-809-953-11	IC CANAL PLUS MODULE BX8185 (B, CP)	
IC601	1-809-957-12	IC H8B7220B	
IC602	1-809-959-11	IC TME656 (B)	
IC603	1-809-958-11	IC BX8189 (B, VP)	
IC605	8-759-511-44	IC LVA522SA	

< JUMPER RESISTOR >

Ref. No.	Part No.	Description	Remark
JR101	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR102	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR103	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR104	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR105	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR106	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR107	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR108	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR109	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR110	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR111	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR112	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR113	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR114	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR115	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR116	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR117	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR119	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR120	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR121	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR122	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR123	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR124	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR125	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR126	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR127	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR128	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR129	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR130	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR131	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR132	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR133	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR134	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR135	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR136	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR137	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR138	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR139	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR140	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR141	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR142	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR143	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR144	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR145	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR146	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR147	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR148	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR149	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR150	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR151	1-216-295-00	METAL CHIP 0 5% 1/10W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
JR152	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR153	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR154	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR155	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR200	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR373	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR374	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR375	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR901	1-216-296-00	METAL CHIP 0 5% 1/8W	(VP)
JR903	1-216-296-00	METAL CHIP 0 5% 1/8W	(AE, AP, EI, IT, VP, UV)
JR906	1-216-295-00	METAL CHIP 0 5% 1/10W	(B, CP)
JR907	1-216-295-00	METAL CHIP 0 5% 1/10W	(B, CP)
JR911	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR912	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR913	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR921	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR927	1-216-295-00	METAL CHIP 0 5% 1/10W	(B, CP)
JR929	1-216-295-00	METAL CHIP 0 5% 1/10W	(B, CP)
JR933	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR934	1-216-295-00	METAL CHIP 0 5% 1/10W	(VP)
JR936	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR938	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR941	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR944	1-216-296-00	METAL CHIP 0 5% 1/8W	(AP, VP, UV)
JR946	1-216-296-00	METAL CHIP 0 5% 1/8W	(AP)
JR947	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR951	1-216-295-00	METAL CHIP 0 5% 1/10W	(AE, AP, EI, IT, VP, UV)

< JUMPER RESISTOR >

Ref. No.	Part No.	Description	Remark
JW204	1-249-429-11	ARBON 10K 5% 1/4W	

< COIL >

Ref. No.	Part No.	Description	Remark
L101	1-414-189-31	INDUCTOR 100uH	
L102	1-410-521-11	INDUCTOR 100uH	
L103	1-410-519-11	INDUCTOR 68uH	
L201	1-410-513-11	INDUCTOR 22uH	
L202	1-414-183-41	INDUCTOR 10uH	
L301	1-414-189-31	INDUCTOR 100uH	
L302	1-414-186-31	INDUCTOR 33uH	(B, VP)
L303	1-408-413-00	INDUCTOR 22uH	
L304	1-410-521-11	INDUCTOR 100uH	
L501	1-410-525-11	INDUCTOR 220uH	(B, CP)
L503	1-410-525-11	INDUCTOR 220uH	(B, CP)
L601	1-414-189-31	INDUCTOR 100uH	
L602	1-408-424-00	INDUCTOR 180uH	
L603	1-414-189-31	INDUCTOR 100uH	
L605	1-414-184-41	INDUCTOR 15uH	
L606	1-410-511-11	INDUCTOR 15uH	
L607	1-414-189-31	INDUCTOR 100uH	
L608	1-410-519-11	INDUCTOR 68uH	(B)
L609	1-408-421-00	INDUCTOR 100uH	
L610	1-414-189-31	INDUCTOR 100uH	
L611	1-414-189-31	INDUCTOR 100uH	(B)
L613	1-414-189-31	INDUCTOR 100uH	(B, VP)
L612	1-414-189-31	INDUCTOR 100uH	
L614	1-410-519-11	INDUCTOR 68uH	
L651	1-414-183-41	INDUCTOR 10uH	
L701	1-414-189-31	INDUCTOR 100uH	
L702	1-408-425-00	INDUCTOR 220uH	
L704	1-410-525-11	INDUCTOR 220uH	
L706	1-408-401-00	INDUCTOR 2.2uH	
L708	1-408-401-00	INDUCTOR 2.2uH	
L801	1-414-189-31	INDUCTOR 100uH	
L802	1-414-183-41	INDUCTOR 10uH	
L804	1-414-183-41	INDUCTOR 10uH	
L805	1-414-185-41	INDUCTOR 22uH	(AE, AP, CP, EI, IT, VP, UV)
L852	1-410-687-11	INDUCTOR 1.2mH	
L853	1-410-687-11	INDUCTOR 1.2mH	

< TRANSISTOR >

Ref. No.	Part No.	Description	Remark
Q101	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q102	8-729-421-19	TRANSISTOR UN2213	
Q103	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q105	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q107	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q201	8-729-424-56	TRANSISTOR UN211L	
Q301	8-729-421-19	TRANSISTOR UN2213	(B, VP)
Q303	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q304	8-729-422-36	TRANSISTOR 2SB709A-Q	
Q305	8-729-422-27	TRANSISTOR 2SD601A-Q	(B, VP)
Q306	8-729-424-18	TRANSISTOR UN2113	
Q501	8-729-422-36	TRANSISTOR 2SB709A-Q	(B, CP)
Q502	8-729-422-27	TRANSISTOR 2SD601A-Q	(B, CP)
Q601	8-729-421-19	TRANSISTOR UN2213	(B, VP)
Q602	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q604	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q605	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q606	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q607	8-729-421-19	TRANSISTOR UN2213	(B)
Q608	8-729-424-56	TRANSISTOR UN211L	
Q609	8-729-421-19	TRANSISTOR UN2213	
Q613	8-729-421-19	TRANSISTOR UN2213	
Q614	8-729-421-19	TRANSISTOR UN2213	(B, VP)
Q615	8-729-424-18	TRANSISTOR UN2113	
Q616	8-729-421-19	TRANSISTOR UN2213	

MA-144

Ref. No.	Part No.	Description				Remark
Q617	8-729-422-36	TRANSISTOR	2SB709A-Q			
Q701	8-729-422-36	TRANSISTOR	2SB709A-Q			
Q702	8-729-424-56	TRANSISTOR	UN211L			
Q703	8-729-421-19	TRANSISTOR	UN2213			
Q704	8-729-422-36	TRANSISTOR	2SB709A-Q			
Q705	8-729-421-19	TRANSISTOR	UN2213			
Q801	8-729-173-38	TRANSISTOR	2SA733-K			
Q802	8-729-422-27	TRANSISTOR	2SD601A-Q			
Q803	8-729-422-27	TRANSISTOR	2SD601A-Q			
Q840	8-729-119-78	TRANSISTOR	2SC2785-HFE (B)			
Q841	8-729-119-78	TRANSISTOR	2SC2785-HFE (B)			
Q851	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q			
Q852	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q			
Q853	8-729-421-19	TRANSISTOR	UN2213			
Q854	8-729-424-08	TRANSISTOR	UN2111			
Q855	8-729-424-18	TRANSISTOR	UN2113			
Q890	8-729-119-78	TRANSISTOR	2SC2785-HFE			

< RESISTOR >

Ref. No.	Part No.	Description				Remark
R101	1-216-119-00	METAL CHIP	820K	5%	1/10W	
R102	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R103	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R104	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R105	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R106	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R107	1-216-037-00	METAL CHIP	330	5%	1/10W	
R108	1-216-025-00	METAL CHIP	100	5%	1/10W	
R111	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R112	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R113	1-216-048-00	METAL CHIP	910	5%	1/10W	
R114	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R115	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R116	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R117	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R118	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R119	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R120	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R121	1-216-041-00	METAL CHIP	470	5%	1/10W	
R122	1-216-033-00	METAL CHIP	220	5%	1/10W	
R123	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R124	1-249-429-11	CARBON	10K	5%	1/4W	
R131	1-249-417-11	CARBON	1K	5%	1/4W	F
R132	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R201	1-216-295-00	METAL CHIP	0	5%	1/10W	
R202	1-216-295-00	METAL CHIP	0	5%	1/10W	
R203	1-249-429-11	CARBON	10K	5%	1/4W	
R204	1-249-429-11	CARBON	10K	5%	1/4W	
R205	1-249-429-11	CARBON	10K	5%	1/4W	
R206	1-249-436-11	CARBON	39K	5%	1/4W	
R207	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R208	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R209	1-215-464-00	METAL	62K	1%	1/6W	
R210	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R211	1-216-661-11	METAL CHIP	2.7K	0.5%	1/10W	
R212	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R213	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R214	1-247-885-00	CARBON	180K	5%	1/4W	
R215	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R216	1-216-198-00	METAL CHIP	1K	5%	1/8W	
R217	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R218	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R219	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R220	1-249-431-11	CARBON	15K	5%	1/4W	
R222	1-249-422-11	CARBON	2.7K	5%	1/4W	F
R223	1-249-429-11	CARBON	10K	5%	1/4W	
R224	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R225	1-249-437-11	CARBON	47K	5%	1/4W	
R226	1-249-437-11	CARBON	47K	5%	1/4W	
R230	1-249-429-11	CARBON	10K	5%	1/4W	
R240	1-249-418-11	CARBON	1.2K	5%	1/4W	F
R301	1-216-073-00	METAL CHIP	10K	5%	1/10W	(B, VP)
R302	1-216-073-00	METAL CHIP	10K	5%	1/10W	(B, VP)
R303	1-216-033-00	METAL CHIP	220	5%	1/10W	
R304	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R305	1-216-295-00	METAL CHIP	0	5%	1/10W	
R306	1-216-295-00	METAL CHIP	0	5%	1/10W	
R307	1-216-043-00	METAL CHIP	560	5%	1/10W	
R308	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R309	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R310	1-216-043-00	METAL CHIP	560	5%	1/10W	
R311	1-249-429-11	CARBON	10K	5%	1/4W	
R312	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R313	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R314	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R315	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R316	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R503	1-216-022-00	METAL CHIP	75	5%	1/10W	(B, CP)
R504	1-249-417-11	CARBON	1K	5%	1/4W	F (B, CP)
R505	1-216-041-00	METAL CHIP	470	5%	1/10W	(B, CP)
R506	1-249-413-11	CARBON	470	5%	1/4W	F (B, CP)
R507	1-249-414-11	CARBON	560	5%	1/4W	F (B, CP)
R509	1-216-076-00	METAL CHIP	13K	5%	1/10W	(B, CP)
R510	1-216-075-00	METAL CHIP	12K	5%	1/10W	(B, CP)
R511	1-216-097-00	METAL CHIP	100K	5%	1/10W	(B, CP)
R512	1-216-097-00	METAL CHIP	100K	5%	1/10W	(B, CP)
R513	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	(B, CP)
R601	1-216-041-00	METAL CHIP	470	5%	1/10W	
R602	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	

Ref. No.	Part No.	Description				Remark
R603	1-249-417-11	CARBON	1K	5%	1/4W	F
R604	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R605	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R606	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R607	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R608	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R609	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R610	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R611	1-216-035-00	METAL CHIP	270	5%	1/10W	
R612	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R613	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R614	1-216-035-00	METAL CHIP	270	5%	1/10W	
R615	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R616	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R617	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R618	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R619	1-249-413-11	CARBON	470	5%	1/4W	F (B)
R620	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R621	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R625	1-249-417-11	CARBON	1K	5%	1/4W	F (VP)
R626	1-249-429-11	CARBON	10K	5%	1/4W	(B, VP)
R627	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R628	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R629	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R630	1-216-041-00	METAL CHIP	470	5%	1/10W	
R631	1-216-043-00	METAL CHIP	560	5%	1/10W	
R632	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R636	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R690	1-216-033-00	METAL CHIP	220	5%	1/10W	(VP)
R690	1-216-295-00	METAL CHIP	0	5%	1/10W	
		(AE, AP, B, CP, EI, IT, UV)				
R691	1-249-401-11	CARBON	47	5%	1/4W	F (VP)
R692	1-249-401-11	CARBON	47	5%	1/4W	F (VP)
R693	1-249-409-11	CARBON	220	5%	1/4W	F (VP)
R701	1-249-408-11	CARBON	180	5%	1/4W	F
		(AE, AP, EI, IT, VP, UV)				
R701	1-249-409-11	CARBON	220	5%	1/4W	F (B, CP)
R702	1-249-407-11	CARBON	150	5%	1/4W	F
		(AE, AP, EI, IT, VP, UV)				
R702	1-249-408-11	CARBON	180	5%	1/4W	F (B, CP)
R703	1-216-021-00	METAL CHIP	68	5%	1/10W	
R704	1-216-022-00	METAL CHIP	75	5%	1/10W	
R705	1-216-049-00	METAL CHIP	1K	5%	1/10W	(B, CP)
R706	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R707	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R708	1-216-041-00	METAL CHIP	470	5%	1/10W	
R709	1-216-041-00	METAL CHIP	470	5%	1/10W	
R710	1-249-414-11	CARBON	560	5%	1/4W	F

Ref. No.	Part No.	Description				Remark
R715	1-216-037-00	METAL CHIP	330	5%	1/10W	
R717	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R804	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R805	1-249-405-11	CARBON	100	5%	1/4W	F
R806	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R807	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R808	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R810	1-216-025-00	METAL CHIP	100	5%	1/10W	
R811	1-216-037-00	METAL CHIP	330	5%	1/10W	
R812	1-216-037-00	METAL CHIP	330	5%	1/10W	
R814	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R815	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R816	1-216-073-00	METAL CHIP	10K	5%	1/10W	(B)
R817	1-216-073-00	METAL CHIP	10K	5%	1/10W	(B)
R819	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	(EI, UV)
R819	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
		(AE, AP, CP, IT, VP)				
R820	1-216-049-00	METAL CHIP	1K	5%	1/10W	(B)
R821	1-216-049-00	METAL CHIP	1K	5%	1/10W	(B)
R825	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
		(AE, AP, CP, EI, IT, VP, UV)				
R825	1-216-295-00	METAL CHIP	0	5%	1/10W	(B)
R830	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
		(AE, AP, CP, EI, IT, VP, UV,)				
R838	1-216-190-00	METAL GLAZE	470	5%	1/8W	(VP)
R838	1-216-296-00	METAL CHIP	0	5%	1/8W	
		(AE, AP, B, CP, EI, IT, UV)				
R866	1-216-001-00	METAL CHIP	10	5%	1/10W	
R868	1-216-081-00	METAL CHIP	22K	5%	1/10W	
⚠R869	1-249-395-11	CARBON	15	5%	1/4W	F
R870	1-216-083-00	METAL CHIP	27K	5%	1/10W	
⚠R871	1-249-394-11	CARBON	12	5%	1/6W	F
R898	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R899	1-216-049-00	METAL CHIP	1K	5%	1/10W	

< RF MODULATOR >

Ref. No.	Part No.	Description	Remark
⚠RF701	1-466-328-11	MODULATOR, RF (RFU-2017)	(AE, AP, CP, IT, VP)
⚠RF701	1-466-348-11	MODULATOR, RF (RFU-2023)	(B)
⚠RF701	1-466-347-11	MODULATOR, RF (RFU-2024)	(EI, UV)

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description
RV202	1-238-019-11	RES, ADJ, CARBON 47K
RV851	1-238-020-11	RES, ADJ, CARBON 100K

< TRANSFORMER >

Ref. No.	Part No.	Description
T851	1-423-413-11	TRANSFORMER, BIAS OSCILLATION
T852	1-423-415-11	TRANSFORMER, BIAS OSCILLATION

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

MA-144 MD-56

Ref. No.	Part No.	Description	Remark

< TUNER >

Ref. No.	Part No.	Description	Remark
⚠TU801	1-465-744-11	TUNER, VIF (BTF-2U601) (UV)	
⚠TU801	1-465-745-11	TUNER, VIF (BTF-2C401) (VP)	
⚠TU801	1-465-746-11	TUNER, VIF (BTF-2C402) (AE, AP, CP, IT)	
⚠TU801	1-465-747-11	TUNER, VIF (BTF-2C403) (EI)	
⚠TU801	1-693-205-11	TUNER (BTF-3C402) (B)	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X201	1-578-774-11	VIBRATOR, CRYSTAL (12MHz)	
X301	1-577-289-11	VIBRATOR, CRYSTAL (17.1MHz)	
X302	1-577-165-11	VIBLATOR, CERAMIC (500KHz)	

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Ref. No.	Part No.	Description	Remark
*	A-6754-472-A	MD-56 BOARD, COMPLETE	

****

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C001	1-161-494-00	CERAMIC	0.022uF		25V
C002	1-161-494-00	CERAMIC	0.022uF		25V
C003	1-126-157-11	ELECT	10uF	20%	16V
C004	1-161-379-00	CERAMIC	0.01uF	20%	25V
C006	1-124-589-11	ELECT	47uF	20%	16V
C008	1-164-159-11	CERAMIC	0.1uF		50V
C009	1-164-159-11	CERAMIC	0.1uF		50V
C022	1-161-379-00	CERAMIC	0.01uF	20%	25V
C025	1-162-294-31	CERAMIC	0.001uF	10%	50V
C026	1-162-294-31	CERAMIC	0.001uF	10%	50V
C050	1-126-163-11	ELECT	4.7uF	20%	50V
C051	1-126-163-11	ELECT	4.7uF	20%	50V
C052	1-126-163-11	ELECT	4.7uF	20%	50V
C053	1-126-157-11	ELECT	10uF	20%	16V
C054	1-126-096-11	ELECT	10uF	20%	35V
C055	1-164-159-11	CERAMIC	0.1uF		50V
C056	1-164-159-11	CERAMIC	0.1uF		50V
C057	1-164-159-11	CERAMIC	0.1uF		50V
C058	1-162-852-11	CERAMIC	0.15uF	10%	16V
C059	1-162-851-11	CERAMIC	0.1uF	10%	16V
C060	1-126-157-11	ELECT	10uF	20%	16V

< CONNECTOR >

Ref. No.	Part No.	Description	Remark
CN001	1-564-726-11	PIN HEADER, ANGLE 10P	
CN002	1-569-335-11	CONNECTOR, BOARD TO BOARD 9P	
CN003	1-691-643-11	CONNECTOR, BOARD TO BOARD	
CN004	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P	
CN005	1-506-482-11	PIN, CONNECTOR 3P	
CN006	1-569-333-11	CONNECTOR, BOARD TO BOARD 3P	
CN007	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P	

< DIODE >

Ref. No.	Part No.	Description		Remark
D001	8-719-985-00	DIODE	GL451VS1	
D004	8-719-109-93	DIODE	RD6.2ES-B2	
D005	8-719-109-93	DIODE	RD6.2ES-B2	
D006	8-719-109-93	DIODE	RD6.2ES-B2	
D007	8-719-109-93	DIODE	RD6.2ES-B2	

< IC >

Ref. No.	Part No.	Description		Remark
IC001	8-759-420-83	IC	AN3814K	
IC002	8-759-912-77	IC	uPC324C	
IC003	8-759-987-16	IC	LM393P	

< PHOTO INTERRUPTER >

Ref. No.	Part No.	Description	Remark
PH001	8-759-144-33	IC PS6002	
PH002	8-759-144-33	IC PS6002	

< TRANSISTOR >

Ref. No.	Part No.	Description		Remark
Q001	8-729-926-31	TRANSISTOR	PT483F1S	
Q002	8-729-926-31	TRANSISTOR	PT483F1S	

< RESISTOR >

Ref. No.	Part No.	Description				Remark
R001	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R002	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R003	1-249-426-11	CARBON	5.6K	5%	1/4W	
R004	1-249-426-11	CARBON	5.6K	5%	1/4W	
R005	1-249-417-11	CARBON	1K	5%	1/4W	F
R006	1-249-441-11	CARBON	100K	5%	1/4W	
R007	1-249-441-11	CARBON	100K	5%	1/4W	
R008	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R009	1-249-408-11	CARBON	180	5%	1/4W	F
R010	1-249-422-11	CARBON	2.7K	5%	1/4W	F
R011	1-249-437-11	CARBON	47K	5%	1/4W	
R012	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R015	1-249-437-11	CARBON	47K	5%	1/4W	
R016	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R017	1-249-429-11	CARBON	10K	5%	1/4W	
R018	1-249-429-11	CARBON	10K	5%	1/4W	
R019	1-249-429-11	CARBON	10K	5%	1/4W	
R020	1-249-429-11	CARBON	10K	5%	1/4W	
R023	1-249-414-11	CARBON	560	5%	1/4W	F
R050	1-249-395-11	CARBON	15	5%	1/4W	F
R051	1-249-395-11	CARBON	15	5%	1/4W	F
R052	1-249-395-11	CARBON	15	5%	1/4W	F
R053	1-249-418-11	CARBON	1.2K	5%	1/4W	F
R054	1-216-347-11	METAL OXIDE	0.68	5%	1W	F
R055	1-249-437-11	CARBON	47K	5%	1/4W	
R056	1-249-430-11	CARBON	12K	5%	1/4W	
R057	1-249-430-11	CARBON	12K	5%	1/4W	

The components identified by
mark ⚠ or dotted line with mark
⚠ are critical for safety.
Replace only with part number
specified.

Ref. No.	Part No.	Description	Remark
R058	1-249-429-11	CARBON 10K 5% 1/4W	
R059	1-249-429-11	CARBON 10K 5% 1/4W	

< SWITCH >

Ref. No.	Part No.	Description	Remark
S001	1-570-953-11	SWITCH, PUSH (1 KEY) (C-U/D)	
S002	1-570-953-11	SWITCH, PUSH (1 KEY) (REC PRF)	

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Ref. No.	Part No.	Description	Remark
*	A-6754-516-A	MF-171 BOARD, COMPLETE	

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< CAPACITOR >

Ref. No.	Part No.	Description	Remark
C202	1-162-282-31	CERAMIC 100PF 10% 50V	
C204	1-162-282-31	CERAMIC 100PF 10% 50V	

< CONNECTOR >

Ref. No.	Part No.	Description	Remark
* CN201	1-691-407-11	CONNECTOR, BOARD TO BOARD 10P	

< DIODE >

Ref. No.	Part No.	Description	Remark
D201	8-719-940-82	LED SLR34MC3	
D202	8-719-940-82	LED SLR34MC3	
D203	8-719-940-99	LED SLR34VC3	
D205	8-719-109-93	DIODE RD6.2ES-B2	

< IC >

Ref. No.	Part No.	Description	Remark
IC201	1-466-833-11	IC RAY-CATCHER BLOCK, REMOCON	

< COIL >

Ref. No.	Part No.	Description	Remark
L202	1-410-336-11	INDUCTOR 220uH	

< JACK >

Ref. No.	Part No.	Description	Remark
PJ201	1-695-863-11	JACK, PIN 2P (LINE IN 2)	

< TRANSISTOR >

Ref. No.	Part No.	Description	Remark
Q201	8-729-421-19	TRANSISTOR UN2213	
Q202	8-729-422-36	TRANSISTOR 2SB709A-Q	

< RESISTOR >

Ref. No.	Part No.	Description	Remark
R201	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R202	1-216-022-00	METAL CHIP 75 5% 1/10W	
R203	1-216-041-00	METAL CHIP 470 5% 1/10W	
R204	1-216-041-00	METAL CHIP 470 5% 1/10W	
R205	1-216-021-00	METAL CHIP 68 5% 1/10W	
R206	1-216-031-00	METAL CHIP 180 5% 1/10W	
R207	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R210	1-216-295-00	METAL CHIP 0 5% 1/10W	

< SWITCH >

Ref. No.	Part No.	Description	Remark
S201	1-571-977-11	SWITCH, TACTIL (ON/STANDBY)	
S202	1-571-977-11	SWITCH, TACTIL (EJECT)	

****

Ref. No.	Part No.	Description	Remark
*	A-6782-000-A	MF-172 BOARD, COMPLETE (AE, AP, IT)	

****

Ref. No.	Part No.	Description	Remark
*	A-6782-008-A	MF-172 BOARD, COMPLETE (EI)	

****

Ref. No.	Part No.	Description	Remark
*	A-6782-010-A	MF-172 BOARD, COMPLETE (B)	

****

Ref. No.	Part No.	Description	Remark
*	A-6782-012-A	MF-172 BOARD, COMPLETE (CP)	

****

Ref. No.	Part No.	Description	Remark
*	A-6782-014-A	MF-172 BOARD, COMPLETE (VP)	

****

Ref. No.	Part No.	Description	Remark
*	A-6782-017-A	MF-172 BOARD, COMPLETE (UV)	

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< BUZZER >

Ref. No.	Part No.	Description	Remark
BZ101	1-529-104-11	BUZZER, PIEZOELECTRIC	

< CAPACITOR >

Ref. No.	Part No.	Description	Remark
C101	1-128-057-11	ELECT 330uF 20% 6.3V	
C102	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C103	1-125-486-11	DOUBLE LAYERS 0.22F 5.5V	
C104	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C105	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C106	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C107	1-163-234-11	CERAMIC CHIP 20PF 5% 50V	
C108	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C109	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C110	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C111	1-124-261-00	ELECT 10uF 20% 50V	
C112	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C113	1-163-117-00	CERAMIC CHIP 100PF 5% 50V	
C114	1-161-329-00	CERAMIC 0.0068uF 20% 16V	

< CONNECTOR >

Ref. No.	Part No.	Description	Remark
CN101	1-568-079-11	CONNECTOR (RECEPTALE) 20P	
CN102	1-568-079-11	CONNECTOR (RECEPTALE) 20P	
CN103	1-695-947-11	CONNECTOR, BOARD TO BOARD 10P	
CN104	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P	

< DIODE >

Ref. No.	Part No.	Description	Remark
D101	8-719-911-19	DIODE 1SS119	
D102	8-719-911-19	DIODE 1SS119	
D104	8-719-110-08	DIODE RD8.2ES-B2	
D107	8-719-200-82	DIODE 11ES2	

MF-172 **MF-173**

< FILTER >

Ref. No.	Part No.	Description	Remark
FL101	1-517-132-11	INDICATOR TUBE, FLUORESCENT (AE, AP, CP, EI, IT, VP, UV)	
FL101	1-517-133-11	INDICATOR TUBE, FLUORESCENT	(B)

< IC >

Ref. No.	Part No.	Description	Remark
IC101	8-759-172-62	IC MB89095-116	
IC102	8-759-501-99	IC ST93C46AB1	
IC103	8-759-520-98	IC PST572K	
IC104	8-759-510-43	IC PST572C	

< JUMPER RESISTOR >

Ref. No.	Part No.	Description	Remark
JR101	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR104	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR111	1-216-295-00	METAL CHIP 0 5% 1/10W	

< COIL >

Ref. No.	Part No.	Description	Remark
L101	1-410-509-11	INDUCTOR 10uH	

< RESISTOR >

Ref. No.	Part No.	Description	Remark
R101	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R102	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R103	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R104	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R106	1-216-057-00	METAL CHIP 2.2K 5% 1/10W (AE, AP, IT)	
R106	1-216-075-00	METAL CHIP 12K 5% 1/10W	(CP)
R106	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(VP)
R106	1-216-081-00	METAL CHIP 22K 5% 1/10W	(EI)
R106	1-216-089-00	METAL CHIP 47K 5% 1/10W	(B)
R106	1-216-295-00	METAL CHIP 0 5% 1/10W	(UV)
R107	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R108	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R109	1-216-033-00	METAL CHIP 220 5% 1/10W	
R110	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R111	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R112	1-216-073-00	METAL CHIP 10K 5% 1/10W	(B, CP)
R113	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R114	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R115	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R116	1-216-095-00	METAL CHIP 82K 5% 1/10W	
R117	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R118	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R119	1-216-198-00	METAL CHIP 1K 5% 1/8W	
R120	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R121	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R122	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R123	1-216-295-00	METAL CHIP 0 5% 1/10W	
R124	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(B, CP)
R125	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(B, CP)
R126	1-216-041-00	METAL CHIP 470 5% 1/10W	
R127	1-216-041-00	METAL CHIP 470 5% 1/10W	
R128	1-216-295-00	METAL CHIP 0 5% 1/10W	
R129	1-249-429-11	CARBON 10K 5% 1/4W	
R130	1-216-198-00	METAL CHIP 1K 5% 1/8W	
R131	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R132	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R133	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R134	1-249-417-11	CARBON 1K 5% 1/4W	F
R135	1-249-417-11	CARBON 1K 5% 1/4W	F
R136	1-216-041-00	METAL CHIP 470 5% 1/10W	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X101	1-579-463-11	VIBRATOR, CRYSTAL (32.768KHz)	
X102	1-579-175-11	VIBRATOR, CERAMIC (10MHz)	

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* A-6782-001-A MF-173 BOARD, COMPLETE (EXCEPT, AP, VP, UV)

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* A-6782-015-A MF-173 BOARD, COMPLETE (AP, VP, UV)

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< CAPACITOR >

Ref. No.	Part No.	Description	Remark
C001	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	

< CONNECTOR >

Ref. No.	Part No.	Description	Remark
CN001	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P	
CN002	1-580-850-11	CONNECTOR (DMS) 8P	

< DIODE >

Ref. No.	Part No.	Description	Remark
D002	8-719-940-99	LED SLR34VC3 (TIMER REC: EXCEPT E5B) (ENR PROG: E5B)	
D003	8-719-940-99	LED SLR34VC3 (REC: EXCEPT E5B) (ENR: E5B)	
D004	8-719-812-32	LED TLY123 (FF: EXCEPT E5B) (◀◀: E5B)	
D005	8-719-940-82	LED SLR34MC3 (FORWARD: EXCEPT E5B) (AVANCE: E5B)	
D006	8-719-946-30	LED SLR34DC3 (PAUSE)	
D007	8-719-940-82	LED SLR34MC3 (REVERSE: EXCEPT E5B) (RETOUR: E5B)	
D008	8-719-812-32	LED TLY123 (REW: EXCEPT E5B) (▶▶: E5B)	
D009	8-719-812-32	LED TLY123 (HI-SPEED REWIND: EXCEPT E5B) (REMBOB REPAIDE: E5B)	
D010	8-719-940-99	LED SLR34VC3 (AUDIO DUB: EXCEPT E5B) (DOUBLAGE SON: E5B)	
D012	8-719-946-30	LED SLR34DC3 (OPC)	

Ref. No.	Part No.	Description	Remark
		< JUMPER RESISTOR >	
JR031	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR032	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR033	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR034	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR035	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR036	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR037	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR038	1-216-296-00	METAL CHIP 0 5% 1/8W	
		< TRANSISTOR >	
Q001	8-729-421-19	TRANSISTOR UN2213	
Q002	8-729-421-19	TRANSISTOR UN2213	
Q003	8-729-421-19	TRANSISTOR UN2213	
Q004	8-729-421-19	TRANSISTOR UN2213	
Q005	8-729-421-19	TRANSISTOR UN2213	
Q006	8-729-421-19	TRANSISTOR UN2213	
Q007	8-729-421-19	TRANSISTOR UN2213	
Q009	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R001	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R002	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R003	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R004	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R005	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R006	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R007	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R008	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R009	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R010	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R011	1-216-081-00	METAL CHIP 22K 5% 1/10W	(AP, VP, UV)
R012	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R013	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R014	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R015	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R016	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R018	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R019	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R020	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R021	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R024	1-216-035-00	METAL CHIP 270 5% 1/10W	
R025	1-216-035-00	METAL CHIP 270 5% 1/10W	
R026	1-216-031-00	METAL CHIP 180 5% 1/10W	
R027	1-216-031-00	METAL CHIP 180 5% 1/10W	
R028	1-216-037-00	METAL CHIP 330 5% 1/10W	
R029	1-216-031-00	METAL CHIP 180 5% 1/10W	
R030	1-216-031-00	METAL CHIP 180 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R031	1-216-031-00	METAL CHIP 180 5% 1/10W	
R032	1-216-037-00	METAL CHIP 330 5% 1/10W	
R034	1-216-035-00	METAL CHIP 270 5% 1/10W	
R035	1-216-075-00	METAL CHIP 12K 5% 1/10W	
		< SWITCH >	
S001	1-571-977-11	SWITCH, TACTIL (REC: EXCEPT E5B) (ENR: E5B)	
S002	1-571-977-11	SWITCH, TACTIL (INPUT SELECT: EXCEPT E5B) (CHOIX ENTREE: E5B)	
S003	1-571-977-11	SWITCH, TACTIL (PROGRAM +: EXCEPT E5B) (CHAIN +: E5B)	
S004	1-571-977-11	SWITCH, TACTIL (PROGRAM -: EXCEPT E5B) (CHAIN -: E5B)	
S005	1-571-977-11	SWITCH, TACTIL (PDC) (AP, VP, UV)	
S006	1-571-977-11	SWITCH, TACTIL (PAUSE)	
S007	1-571-977-11	SWITCH, TACTIL (HI-SPEED REWIND: EXCEPT E5B) (REMBOB RAPIDE :E5B)	
S008	1-571-977-11	SWITCH, TACTIL (TIMER REC: EXCEPT E5B) (ENR PROG: E5B)	
S009	1-572-907-11	SWITCH, SLIDE (PICTURE: EXCEPT E5B) (IMAGE: E5B)	
S010	1-572-907-11	SWITCH, SLIDE (COLOR SYSTEM: EXCEPT E5B) (SYSTEM COULEUR: E5B)	
S011	1-692-381-11	SWITCH, SLIDE (NTSC PB: EXCEPT E5B) (LECTURE NTSC: E5B)	
S012	1-571-977-11	SWITCH, TACTIL (OPC)	
S901	1-572-662-11	SWITCH, ROTARY (DUAL MODE SHUTTLE)	
**			
*	A-6755-956-A	PD-37 BOARD, COMPLETE (AP, UV) ***************************	
		< CAPACITOR >	
C003	1-163-038-00	CERAMIC CHIP 0.1uF 25V	
C004	1-124-589-11	ELECT 47uF 20% 16V	
C005	1-163-227-11	CERAMIC CHIP 10PF 0.5PF 50V	
C006	1-163-227-11	CERAMIC CHIP 10PF 0.5PF 50V	
C007	1-163-038-00	CERAMIC CHIP 0.1uF 25V	
C008	1-124-589-11	ELECT 47uF 20% 16V	
C009	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C010	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C011	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C012	1-126-301-11	ELECT 1uF 20% 50V	
C014	1-163-038-00	CERAMIC CHIP 0.1uF 25V	
		< CONNECTOR >	
* CN001	1-565-438-11	SOCKET, CONNECTOR (PCB) 10P	

PD-37 POWER BLOCK

Ref. No.	Part No.	Description	Remark
		< DIODE >	
D001	8-719-801-48	DIODE 1SS193	
D002	8-719-801-48	DIODE 1SS193	
D003	8-719-911-19	DIODE 1SS119	
D004	8-719-911-19	DIODE 1SS119	
		< IC >	
IC001	8-752-843-10	IC CXP80316-021Q	
IC002	8-759-168-94	IC MV1820E-CG-MPEE	
IC003	8-759-504-44	IC MM1031XMR	
		< JUMPER RESISTOR >	
JR001	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR002	1-216-296-00	METAL CHIP 0 5% 1/8W	
		< COIL >	
L001	1-410-521-11	INDUCTOR 100uH	
L002	1-410-509-11	INDUCTOR 10uH	
		< RESISTOR >	
R001	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R002	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R003	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R004	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R005	1-216-073-00	METAL CHIP 10K 5% 1/10W	
		< VIBRATOR >	
X001	1-579-125-11	VIBRATOR, CERAMIC (8MHz)	
X002	1-579-971-11	VIBRATOR, CRYSTAL (27.5MHz)	
**			
⚠	1-413-789-11	POWER BLOCK (AE, AP, B, CP, EI, IT, VP) ********************************	
⚠	1-413-790-11	POWER BLOCK (UV) ****************	
		< CAPACITOR >	
⚠C101	9-902-933-01	MATAL FILM 0.22uF	250V
⚠C102	9-902-934-01	MATAL FILM 0.1uF	250V
⚠C103	9-904-183-01	CERAMIC 1000PF	
⚠C104	9-904-183-01	CERAMIC 1000PF	
⚠C105	9-904-183-01	CERAMIC 1000PF	
⚠C106	9-904-183-01	CERAMIC 1000PF	
⚠C107	9-902-936-01	CERAMIC 4700PF	
⚠C108	9-902-936-01	CERAMIC 4700PF	
⚠C109	9-902-936-01	CERAMIC 4700PF	
⚠C110	9-904-184-01	ELECT 68uF	400V
C111	9-904-185-01	ELECT 1uF	100V

Ref. No.	Part No.	Description	Remark
C112	9-902-055-01	CERAMIC 100PF	1KV
⚠C113	9-900-525-01	METAL FILM 0.047uF	400V
C114	1-130-491-51	FILM 0.047uF	50V
C115	1-130-491-51	FILM 0.047uF	50V
C201	1-126-964-51	ELECT 10uF	50V
C202	1-126-768-51	ELECT 2200uF	16V
C203	1-126-933-51	ELECT 100uF	16V
C204	1-126-927-51	ELECT 2200uF	10V
C205	1-124-472-11	ELECT 470uF	10V
C206	1-126-925-51	ELECT 100uF	50V
C207	1-126-916-51	ELECT 1000uF	6.3V
C208	1-126-960-51	ELECT 1uF	50V
C210	1-130-483-51	FILM 0.01uF	50V
C211	1-130-483-51	FILM 0.01uF	50V
		< CONNECTOR >	
CN1	1-568-787-11	CONNECTOR 10P	
CN2	1-568-786-12	CONNECTOR 9P	
⚠CN101	9-904-187-01	CONNECTOR 2P (AC IN)	
		< DIODE >	
⚠D101	9-900-511-01	BRIDGE DIODE S1WBA60	
⚠D102	9-900-513-01	DIODE EG01C	
⚠D103	8-719-200-82	DIODE 11ES2	
⚠D104	8-719-109-61	ZENER DIODE RD3.0ES	
⚠D105	9-900-514-01	DIODE MA165	
⚠D106	9-902-050-01	DIODE ERA15-06	
D201	9-900-534-01	DIODE ERA18-02	
⚠D202	9-902-061-01	DIODE RG4Z	
⚠D203	8-719-200-82	DIODE 11ES2	
⚠D204	8-719-981-00	DIODE RK34	
D206	9-900-534-01	DIODE ERA18-02	
⚠D207	9-902-064-01	DIODE ERA81-004	
⚠D208	9-903-933-01	ZENER DIODE RD15F	
		< FUSE >	
⚠F101	1-532-388-51	FUSE (250V 2A)	
		< FERRITE BEAD >	
⚠FB-1	9-902-053-01	BEADS CORE	
		< IC >	
⚠IC201	9-900-533-01	IC HA17431P	
		< COIL >	
⚠L101	9-904-182-01	LINE FILTER	
L202	9-902-762-01	CHOKE COIL 20uH	
L203	9-902-762-01	CHOKE COIL 20uH	

The components identified by
mark ⚠ or dotted line with mark
⚠ are critical for safety.
Replace only with part number
specified.

Ref. No.	Part No.	Description			Remark
		< TRANSISTOR >			
⚠Q101	9-904-179-01	TRANSISTOR	2SC4231		
⚠Q102	9-900-517-01	TRANSISTOR	2SC3377		
		< RESISTOR >			
⚠R101	9-902-945-01	CARBON	1M	1/2W	F
R102	1-247-883-31	CARBON	150K	1/4W	
R103	1-247-883-31	CARBON	150K	1/4W	
R104	1-247-863-31	CARBON	22K	1/4W	
⚠R105	9-904-186-01	CEMENT	4.7	2W	
⚠R106	9-902-942-01	METAL OXIDE FILM	68K	3W	
⚠R107	1-247-739-51	CARBON	100	1/2W	F
⚠R108	1-247-739-51	CARBON	100	1/2W	F
R109	1-247-827-31	CARBON	(680)	1/2W(FOR ADJUSTMENT)	
R110	1-247-883-31	CARBON	150K	1/4W	
⚠R201	1-247-727-11	CARBON	10	1/2W	F
⚠R202	1-247-727-11	CARBON	10	1/2W	F
⚠R203	1-212-857-51	FUSE	10	1/4W	F
⚠R204	9-902-074-01	FUSE	0.47	1/4W	F
R205	1-244-841-11	CARBON	47	1/2W	
R206	1-215-428-11	METAL FILM	2K	1/4W	
R207		CARBON (FOR ADJUSTMENT)			
R208	1-215-425-31	METAL FILM	(1.5K)	1/4W (FOR ADJUSTMENT)	
		< VARIABLE RESISTOR >			
RV201	9-902-761-01	RES, ADJ, METAL	200		
		< TRANSFORMER >			
⚠T101	9-904-181-01	SWITCHING TRANSFORMER			

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* A-6727-490-A RP-163 BOARD, COMPLETE

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Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C801	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C802	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C803	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C804	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C805	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C806	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C807	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C808	1-124-584-00	ELECT	100uF	20%	10V
C809	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C810	1-124-584-00	ELECT	100uF	20%	10V
C811	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C812	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C813	1-164-336-11	CERAMIC CHIP	0.33uF		25V
C814	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C815	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C816	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C817	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C818	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C819	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C820	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C821	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C822	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C823	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C824	1-124-589-11	ELECT	47uF	20%	16V
C826	1-124-589-11	ELECT	47uF	20%	16V
C827	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C831	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C834	1-163-088-00	CERAMIC CHIP	5PF		50V
C835	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C839	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C840	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C841	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C842	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C843	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C850	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C851	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C852	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C853	1-163-031-11	CERAMIC CHIP	0.01uF		50V
		< CONNECTOR >			
CN801	1-695-486-11	CONNECTOR, BOARD TO BOARD 10P			
CN802	1-506-490-21	PIN, CONNECTOR 11P			
* CN803	1-564-018-51	PIN, CONNECTOR 8P			
* CN804	1-564-028-00	PIN, CONNECTOR 3P			
		< DIODE >			
D801	8-719-400-18	DIODE	MA152WK		
D802	8-719-400-18	DIODE	MA152WK		
D803	8-719-400-18	DIODE	MA152WK		
D804	8-719-400-18	DIODE	MA152WK		
D805	8-719-400-18	DIODE	MA152WK		
D806	8-719-400-18	DIODE	MA152WK		
		< IC >			
IC801	8-759-046-75	IC	HA118162NT		
		< COIL >			
L801	1-410-525-11	INDUCTOR 220uH			
L802	1-410-525-11	INDUCTOR 220uH			
L803	1-410-521-11	INDUCTOR 100uH			
L804	1-410-521-11	INDUCTOR 100uH			

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Replace only with part number
specified.

Ref. No.	Part No.	Description	Remark
L806	1-410-515-11	INDUCTOR 33uH	
L807	1-410-516-11	INDUCTOR 39uH	
L808	1-410-511-11	INDUCTOR 15uH	
L809	1-410-511-11	INDUCTOR 15uH	
L810	1-410-524-41	INDUCTOR 180uH	
L811	1-410-521-11	INDUCTOR 100uH	
L812	1-410-521-11	INDUCTOR 100uH	
L850	1-410-509-11	INDUCTOR 10uH	
		< TRANSISTOR >	
Q802	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q803	8-729-901-06	TRANSISTOR DTA144EK	
Q804	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q805	8-729-422-37	TRANSISTOR 2SB709A-R	
Q806	8-729-422-37	TRANSISTOR 2SB709A-R	
Q807	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q808	8-729-421-19	TRANSISTOR UN2213	
Q809	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q810	8-729-421-19	TRANSISTOR UN2213	
Q811	8-729-301-98	TRANSISTOR 2SB1000A-L	
Q813	8-729-421-19	TRANSISTOR UN2213	
Q814	8-729-421-19	TRANSISTOR UN2213	
Q815	8-729-216-22	TRANSISTOR 2SA1162	
Q816	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q817	8-729-216-22	TRANSISTOR 2SA1162	
Q818	8-729-216-22	TRANSISTOR 2SA1162	
Q821	8-729-421-19	TRANSISTOR UN2213	
Q822	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R801	1-216-023-00	METAL CHIP 82 5% 1/10W	
R802	1-216-043-00	METAL CHIP 560 5% 1/10W	
R806	1-216-023-00	METAL CHIP 82 5% 1/10W	
R807	1-216-023-00	METAL CHIP 82 5% 1/10W	
R808	1-216-023-00	METAL CHIP 82 5% 1/10W	
R809	1-216-021-00	METAL CHIP 68 5% 1/10W	
R810	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R811	1-216-043-00	METAL CHIP 560 5% 1/10W	
R812	1-216-023-00	METAL CHIP 82 5% 1/10W	
R813	1-216-047-00	METAL CHIP 820 5% 1/10W	
R815	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	
R816	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R817	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R818	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R819	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R820	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R821	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R822	1-216-039-00	METAL CHIP 390 5% 1/10W	
R823	1-216-047-00	METAL CHIP 820 5% 1/10W	
R824	1-216-039-00	METAL CHIP 390 5% 1/10W	
R825	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R826	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R827	1-216-045-00	METAL CHIP 680 5% 1/10W	
R828	1-216-043-00	METAL CHIP 560 5% 1/10W	
R829	1-216-047-00	METAL CHIP 820 5% 1/10W	
R830	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R831	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R832	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R833	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R834	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R838	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R839	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R840	1-216-309-00	METAL CHIP 5.6 5% 1/10W	
R841	1-216-045-00	METAL CHIP 680 5% 1/10W	
R842	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R843	1-216-011-00	METAL CHIP 27 5% 1/10W	
R848	1-216-295-00	METAL CHIP 0 5% 1/10W	
R849	1-216-043-00	METAL CHIP 560 5% 1/10W	
R850	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R854	1-249-409-11	CARBON 220 5% 1/4W	F

****

*	A-6754-476-A	VP-32 BOARD, COMPLETE (VP) **************************	
		< CAPACITOR >	
C901	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C902	1-163-809-11	CERAMIC CHIP 0.047uF 10% 25V	
C904	1-163-809-11	CERAMIC CHIP 0.047uF 10% 25V	
C906	1-163-989-11	CERAMIC CHIP 0.033uF 10% 25V	
C910	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
		< CONNECTOR >	
* CN901	1-695-948-11	CONNECTOR, BOARD TO BOARD 10P	
		< DIODE >	
D901	8-719-911-19	DIODE 1SS119	
		< IC >	
IC901	8-759-030-60	IC SDA5642	
IC902	8-759-147-30	IC uPD75004GB-VSX182	

< COIL >

Ref. No.	Part No.	Description	Remark
L941	1-410-509-11	INDUCTOR 10uH	

< RESISTOR >

Ref. No.	Part No.	Description	Remark
R901	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R902	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R903	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R904	1-216-119-00	METAL CHIP 820K 5% 1/10W	
R905	1-216-025-00	METAL CHIP 100 5% 1/10W	
R906	1-216-119-00	METAL CHIP 820K 5% 1/10W	
R907	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R908	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R910	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R911	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R912	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R913	1-216-073-00	METAL CHIP 10K 5% 1/10W	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X901	1-577-101-11	VIBRATOR, CERAMIC (4.19MHz)	

****

MISCELLANEOUS

****

Ref. No.	Part No.	Description	Remark
30	1-466-935-21	REMOTE COMMANDER (RMT-AG1) (UV)	
260	1-543-647-11	HEAD, FE	
290	1-550-870-11	DRUM ASSY, ROTARY BOTTOM (DZL-59A-R)	
291	1-550-869-11	DRUM ASSY, ROTARY UPPER (DZR-59-R)	
M902	8-835-489-01	MOTOR, DC U-26K	
M903	X-3733-302-1	MOTOR ASSY, CAM	
M904	X-3727-784-1	MOTOR ASSY	
S1	1-692-062-11	SWITCH, ROTARY	

****

ACCESSORIES & PACKING MATERIALS

****

Ref. No.	Part No.	Description	Remark
24	1-466-918-21	REMOTE COMMANDER (RMT-V131A) (AE, AP, CP, EI, IT, VP, UV)	
24	1-466-918-41	REMOTE COMMANDER (RMT-V131C) (B)	
⚠	1-574-056-11	CORD, POWER (VP)	
⚠	1-574-131-21	CORD, POWER SUPPLY (AE, AP, B, CP, EI, IT)	
⚠	1-590-865-11	CORD, POWER (UV)	
	1-696-593-11	CORD, CONNECTION (PAL) (AE, AP, CP, EI, IT, VP, UV)	
	1-696-905-11	CORD, CONNECTION (B)	
	3-695-308-01	DRIVER, VOLUME	
	3-755-994-11	MANUAL, INSTRUCTION (English) (EI, UV)	
	3-755-994-41	MANUAL, INSTRUCTION (Italian) (AE, IT)	
	3-755-994-51	MANUAL, INSTRUCTION (French, German, Italian) (VP)	
	3-755-994-61	MANUAL, INSTRUCTION (French) (B)	
*	3-755-994-71	MANUAL, INSTRUCTION (Spanish) (C)	
	3-755-994-81	MANUAL, INSTRUCTION (Dutch, French, German) (AE)	
	3-755-994-91	MANUAL, INSTRUCTION (Swedish, Danish, Portuguese) (AE)	
	3-756-916-11	MANUAL, INSTRUCTION (UV)	
	3-756-999-11	MANUAL, INSTRUCTION (Dutch) (AP)	
*	3-951-057-21	INDIVIDUAL CARTON (AE, AP, CP, EI, IT, VP)	
*	3-951-057-31	INDIVIDUAL CARTON (B, EI)	
*	3-951-057-51	INDIVIDUAL CARTON (UV)	
*	3-951-060-01	CUSHION (UPPER)	
*	3-951-061-01	CUSHION (LOWER)	

****

****

HARDWARE LIST

****

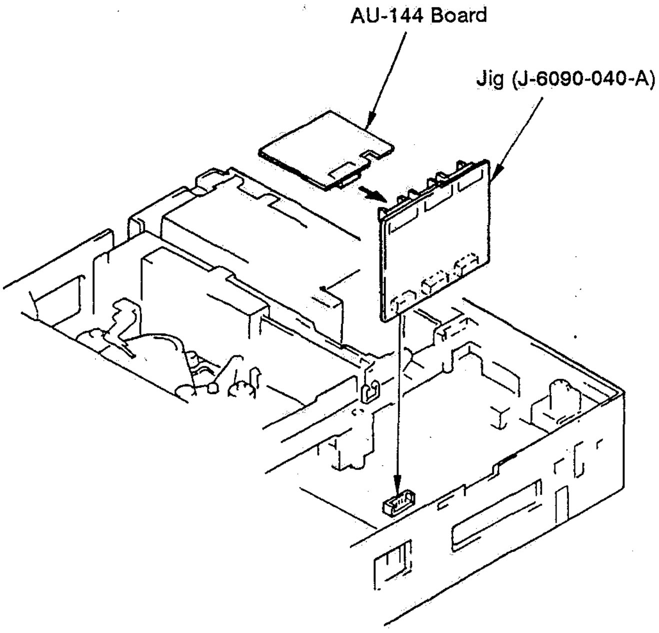
Ref. No.	Part No.	Description
#1	7-621-255-25	SCREW +PTT 2X4 (S)
#2	4-921-277-11	SCREW (B2.6X8), TAPPING, BIND
#3	7-685-646-81	SCREW +BVTP 3X8 TYPE2
#4	7-682-645-01	SCREW +PS 3X4
#5	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3
#6	7-682-548-04	SCREW +P 3X8
#7	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#8	7-621-732-08	SCREW
#10	7-628-254-05	SCREW +PS 2.6X5
#11	7-624-102-04	STOP RING 1.5, TYPE -E
#12	7-685-648-79	SCREW +BVTP 3X12 TYPE2
#13	7-682-546-04	SCREW +P 3X5

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SECTION 7
ELECTRICAL ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram relevant to the adjustments on Page 139.

- When checking AU-144 board, use the translation board jig (J-6090-040-A).


AU-144 Board
Jig (J-6090-040-A)

7-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

7-1-1. Instruments to be Used

Color TV
2) Oscilloscope 1 or 2 phenomena, band more than 30 MHz, delay mode, as provided.
3) Frequency counter (min. 8 digits)
4) PAL pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio generator
8) Attenuator
9) Distortion factor meter
10) Voice multiple signal generator
11) Alignment tape
    Part Code: H7099052H (MH-2)
12) HiFi alignment tape

7-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

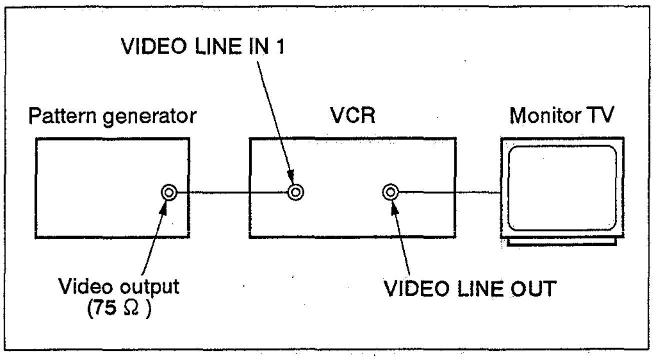

VIDEO LINE IN 1
Pattern generator
VCR
Monitor TV
Video output
(75 Ω)
VIDEO LINE OUT

Fig. 7-1.

7-1-3. Set-up Adjustment

In this adjustment, PAL pattern generator is connected with LINE 1 input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal SYNC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst sigal and "red" signal are 0.30 : 0.66. Fig. 7-2. shows video signals (color bars) used in adjusting the video section.

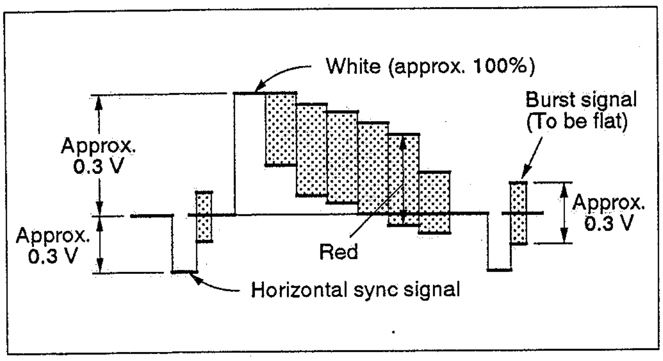

White (approx. 100%)
Burst signal
(To be flat)
Approx.
0.3 V
Approx.
0.3 V
Approx.
0.3 V
Red
Horizontal sync signal

Fig. 7-2.

7-1-4. Alignment Tape (MH-2)

	Time	Video signal	Audio signal
1	10 minutes	Stair-step	6 kHz
2	5 minutes	—	3 kHz
3	10 minutes	Color bar	1 kHz
4	3 minutes	RF sweep	—

Table. 7-1.

7-1-5. Specified I/O Level and Impedance

Input/output terminal

Video inputs LINE IN : phono jacks
EURO-AV : 21-pin (Pin ⑳) 1 Vp-p, 75 Ω, unbalanced, sync negative

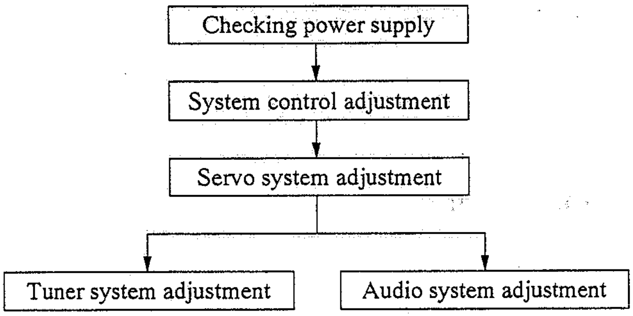
Audio inputs LINE IN : phono jacks
47 kΩ, − 7.5 dBs (0 dBs = 0.775 Vrms)
EURO-AV : 21-Pin (Pin ② and ⑥)
More than 10 kΩ, − 4 dBs

Video outputs LINE OUT : phono jack
EURO-AV : 21-pin (Pin ⑲) 1 Vp-p, 75 Ω, unbalanced, sync negative

Audio outputs LINE OUT : phono jack
− 7.5 dBs at load impedance 47 kΩ
Output impedance : less than 10 kΩ
EURO-AV : 21-Pin (Pin ① and ③)
Output impedance : less than 1 kΩ
−4 dBs with 10 kΩ load

7-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.


Checking power supply
System control adjustment
Servo system adjustment
Tuner system adjustment
Audio system adjustment

7-2. POWER SUPPLY CHECK (POWER BLOCK)

Mode	E-E
Measuring Instrument	Digital voltmater
UNSW 6.0 V check	
Measurement Point	Pin ⑤ of CN2
Specified Value	5.9 ± 0.05 Vdc
UNSW − 30 V check	
Measurement Point	Pin ⑤ of CN2
Specified Value	− 27.0 ± 3.0 Vdc
UNSW 35 V check	
Measurement Point	Pin ⑨ of CN2
Specified Value	37.0 ± 3.0 Vdc
UNSW 12 V check	
Measurement Point	Pin ① of CN2
Specified Value	13.6 ± 0.4 Vdc
MTR 12 V check	
Measurement Point	Pin ⑩ of CN1
Specified Value	13.0 ± 0.4 Vdc
HEATER 4 V check	
Measurement Point	+ : Pin ② of CN1 − : Pin ① of CN1
Specified Value	4.1 ± 0.3 Vdc

Checking Method:

1) Confirm that each voltage meets its specified value.

POWER BLOCK (Conductor side)

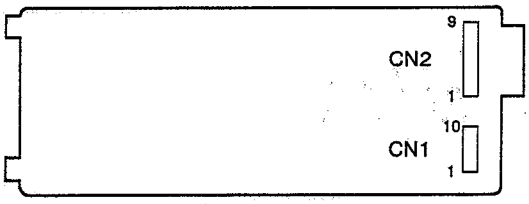

9
CN2
1
10
CN1
1

Fig. 7-3.

7-3. SYSTEM CONTROL CHECK

7-3-1. Clock Adjustment (MF-172 Board)

Measurement Point	Pin ⑥ of IC101
Measurement Instrument	Frequency counter
Specified Value	10.0 ± 0.2 MHz

Checking Method:

1) Check the reading on frequency counter 10.0 ± 0.2 MHz.

7-4. SERVO SYSTEM ADJUSTMENT

7-4-1. Switching Position Adjustment (MA-144 Board)

Mode	PB
Signal	Alignment tape : SP stair-step section
Measurement Point	CH1: CNJ701 (VIDEO LINE OUT) CH2: Pin ⑲ of CN601 (RF SWP)
Measuring Instrument	Oscilloscope
Adjusting Element	RV202
Specified Value	6.5 ± 0.5 H (416 ± 32 μsec)

Adjusting Method:

1) Once set to STOP mode, then to PB mode.
2) Check that switching position is 6.5 ± 0.5 H. (416 ± 32 μsec)
   If not meet the specified value, turn RV202 and repeat steps 1) to 2).

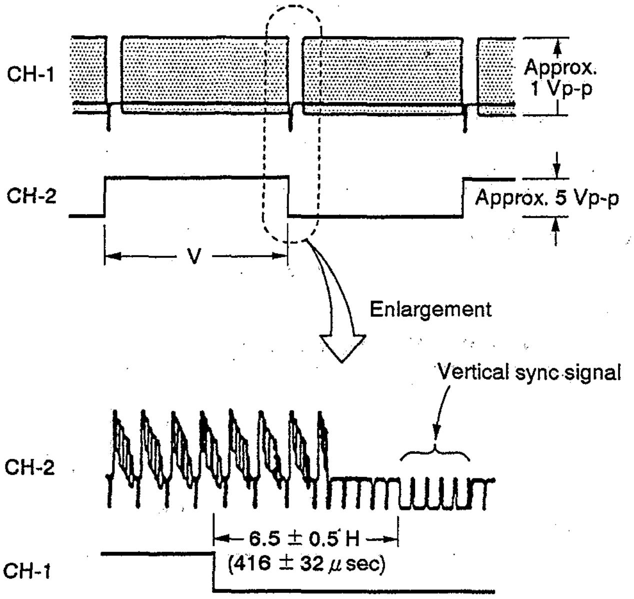

CH-1
Approx. 1 Vp-p
CH-2
Approx. 5 Vp-p
V
Enlargement
Vertical sync signal
CH-2
6.5 ± 0.5 H
(416 ± 32 μsec)
CH-1

Fig. 7-4.

7-5. AUDIO SYSTEM ADJUSTMENTS

- Adjust the audio system in the SP mode, unless otherwise specified.
  Use the alignment tape.
- Adjust both Lch and Rch.

[Connection]

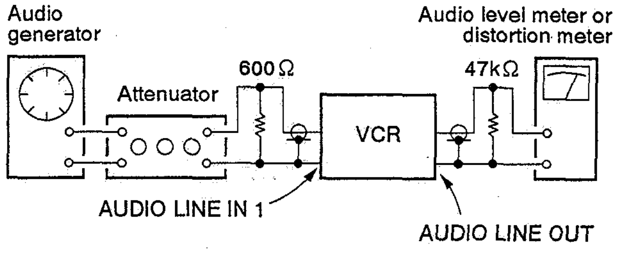

Audio generator
Audio level meter or distortion meter
600Ω
47kΩ
Attenuator
VCR
AUDIO LINE IN 1
AUDIO LINE OUT

Fig. 7-5.

7-5-1. Normal Audio System Adjustment

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
- Make adjustment with the switches set to the following positions.
  INPUT SELECT switch ...... LINE 1

[Adjusting Sequence]

1. ACE head adjustment ... See Mechanism Block Adjustment
2. E-E output level check
3. Recording bias adjustment
4. Overall level characteristic and distorsion check

1. ACE Head Adjustment

See "Mechanism Block Adjustment".

2. E-E Output Level Check

Mode	E-E
Signal	L, R : 400 Hz, − 7.5 dBs
Measurement Point	AUDIO LINE OUT L or R
Adjusting Element	Audio level meter
Specified Value	− 7.5 ± 2 dBs

Confirming Method:

1) Simultaneously input a signal of 400 Hz, − 7.5 dBs to both L and R channels of Audio Line Input.
2) Confirm that the audio output level is − 7.5 ± 2 dBs.

3. Recording Bias Adjustment (MA-144 Board)

Mode	REC and PB
Signal	400 Hz, − 30 dBs 7 kHz, − 30 dBs
Measurement Point	AUDIO LINE OUT L or R
Measuring Instrument	Audio level meter
Adjusting Element	RV851
Specified Value	0 ± 1 dB

Adjusting Method:

1) Supply a signal of 400 Hz, − 30 dBs to Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate − 30 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output levels within a range of the 400 Hz playback output level 0 ± 1 dB. When beyond this range, sdjust RV851 and repeat the steps 1) through 7) above.

4. Overall Level Characteristic and Distortion Factor Check

Mode	REC and PB
Signal	400 Hz, − 7.5 dBs
Measurement Point	AUDIO LINE OUT L or R
Measuring Instrument	Audio level meter and distortion factor gauge
Specified Value	Playback level : − 7.5 ± 2 dBs Distortion factor : 4% or less

Confirming Method:

1) Supply an audio signal of 400 Hz, − 7.5 dBs simultaneously to both L and R channels of Audio Line Input.
2) Make recording.
3) Playback a recorded portion.
4) Confirm that a playback level is − 7.5 ± 2 dBs.
5) Confirm that a distortion factor is within 4%.

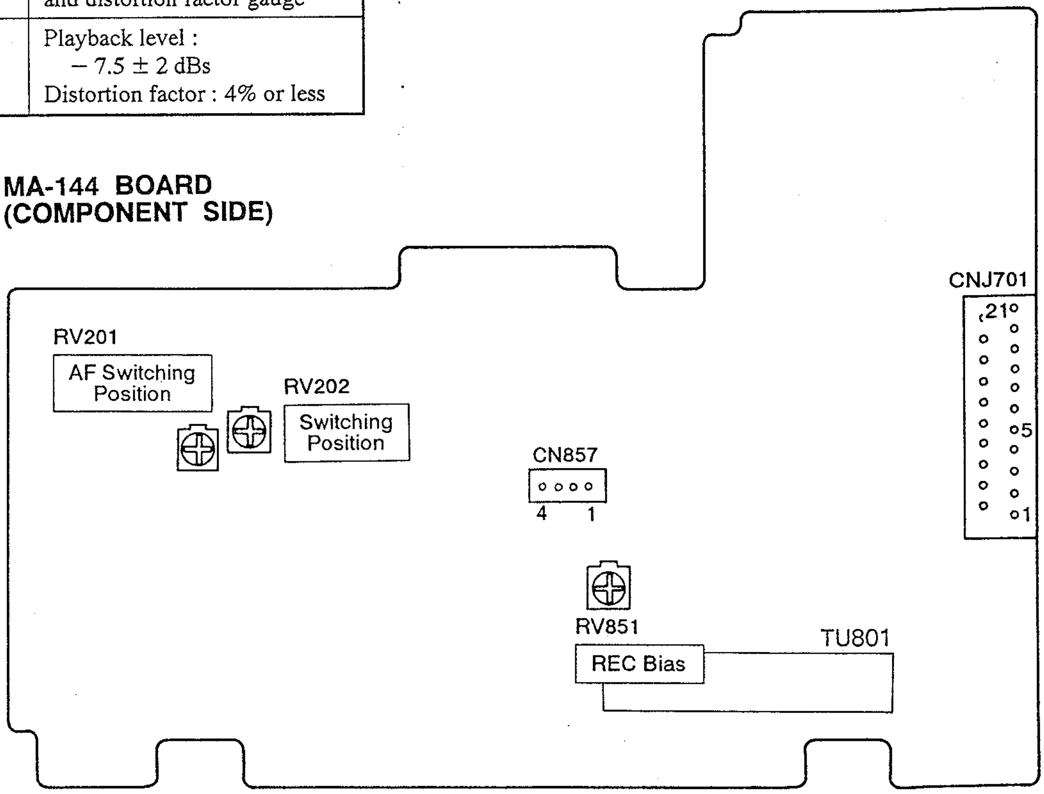
7-6. TUNER SYSTEM ADJUSTMENT

Signal	SLV-E5AE/AP/B/CP/IT RF : E-5 CH, 66 ± 5dB μV SLV-E5VP RF : E-5 CH, 63 ± 5dB μV SLV-E6UV RF : B-30 CH, 66 ± 5dB μV (Video: Color Bar) (Audio: Optional)
Mesurement Point	TU801 Pin ④
Measuring Instrument	Digital voltmeter
Specified Value	6.0 ± 0.5 V

Cheking Method:

1) Tune in the casnnel above in the table.
2) Connect a digital voltmeter to TU801 Pin ④ and confirm the reading on a digital voltmeter gose 6.0 ± 0.5 V.

7-7. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS


MA-144 BOARD
(COMPONENT SIDE)

9-973-405-11

Sony Corporation
Home Video Group

English
93E0555-1
Printed in Japan

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Published by CV Quality Engineering DIV.

V13021

SLV-E5AE/AP/B/CP/EI/IT/VP
SLV-E6UV

SONY
SERVICE MANUAL

AEP Model
SLV-E5AE
Netherlands Model
SLV-E5AP
French Model
SLV-E5B
Spanish Model
SLV-E5CP
Irish Model
SLV-E5EI
Itarian Model
SLV-E5IT
German Model
SLV-E5VP
UK Model
SLV-E6UV

CORRECTION-1

Please corrected your service manual.
(96-012)

☛ : **Indicates corrected portion.**

Page	INCORRECT				CORRECT			
	Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
114	1	X-3942-978-1	DOOR BLOCK ASSY (M), HALF (UV)		1	X-3942-973-1 ☛	DOOR BLOCK ASSY (M), HALF (UV)	

9-973-405-91

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Consumer A&V Products Company
Home A&V Products Div.

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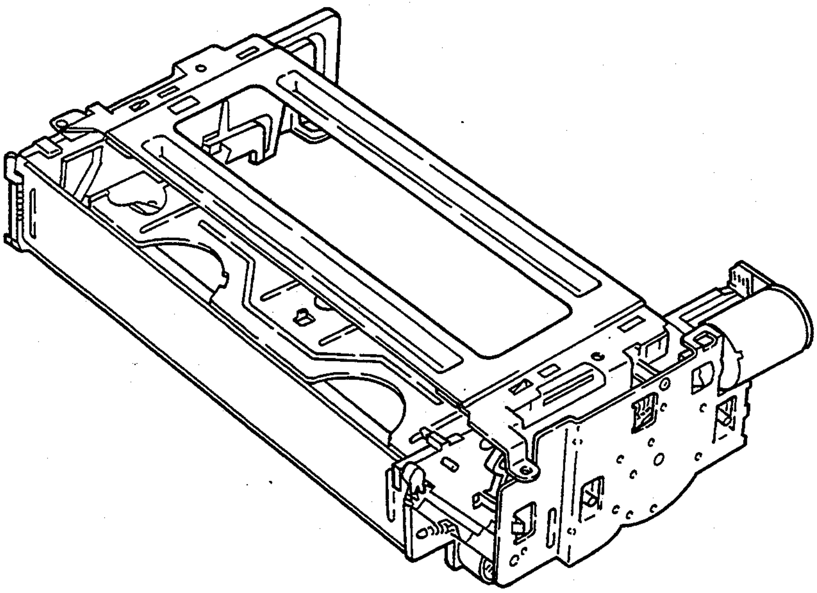
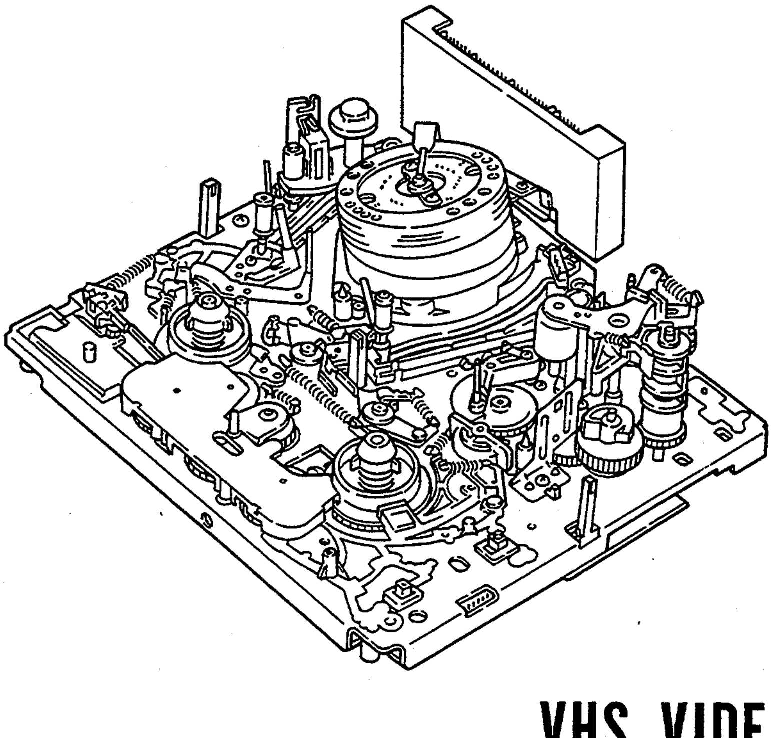
Quality Engineering De

VIDE-V12926

VHS MECHANICAL ADJUSTMENT MANUAL II

- Please use in conjunction with the SERVICE MANUAL.
- This VHS MECHANICAL ADJUSTMENT MANUAL II can be used for NTSC system and PAL system.





MICROFILM

VHS VIDEO RECORDER

SONY®

TABLE OF CONTENTS

Section *Title* *Page*

1. PREPARATIONS FOR CHECKS, ADJUSTMENTS AND REPLACEMENT OF THE DECK MECHANISM

1-1. Loading and unloading video cassettes with the power off 3
  1-1-1. Manual loading and unloading 3
  1-1-2. Loading and unloading using a separate power source 3
1-2. Threading and unthreading with the power off 3
  1-2-1. Manual threading and unthreading 3
  1-2-2. Threading and unthreading using a separate power source 3
1-3. To complete threading with the FL cassette controller removed 4

2. PERIODICAL INSPECTION AND REPLACEMENT

2-1. Cleaning the rotary head disc ass'y 5
2-2. Cleaning the tape transport system 5
2-3. Cleaning the drive system 5
2-4. Periodic Maintenance 6
2-5. Service Tools and Jigs 7

3. REPLACEMENT OF MAJOR COMPONENT PARTS OF THE DECK MECHANISM

3-1. FL mechanism 8
  3-1-1. FL door 8
  3-1-2. Erasure protection lever 8
  3-1-3. Gear cover ass'y 8
  3-1-4. Loading motor, worm gear (FL), worm wheel (FL), worm bearing 8
  3-1-5. Door OPEN/CLOSE arm 9
3-2. TS ass'y and guide roller ass'y No.2 9
3-3. ACE ass'y 10
3-4. Drum ass'y 10
3-5. Drum base ass'y 10
3-6. Pinch roller ass'y and elevator cam 11
3-7. Cam gear, press and transmission gear 11
3-8. RVS arm ass'y and RVS cam gear 12
3-9. Guide No.7 12
3-10. S-brake ass'y, T-brake ass'y 13
3-11. T-soft brake ass'y, REV brake arm 13
3-12. S-soft brake arm ass'y 13
3-13. S-guide and T-guide roller assy's 14
3-14. Reel lock release and REW gear 14
3-15. Tension regulator arm ass'y, tension regulator band ass'y 15
3-16. S take-up ass'y 15
3-17. S-reel ass'y 16
3-18. T-reel ass'y 16
3-19. Pendulum arm ass'y 16
3-20. Relay gear 17
3-21. Adjuster arm ass'y 17
3-22. CAP brake ass'y 17
3-23. Capstan motor 18
3-24. Rotary switch 18
3-25. RKB cam gear 19
3-26. Sub-chassis ass'y 19
3-27. Pendulum slide plate, pendulum arm 20
3-28. The limiter arm and limiter slide plate 20
3-29. Cam motor 20
3-30. Cam gear 20
3-31. Tension regulator arm, S take-up arm 21
3-32. Mode slide plate, RVS relay gear 21
3-33. Brake arm, brake slide plate 21
3-34. Right shuttle, right loading gear ass'y 22
3-35. Left shuttle ass'y, left loading gear ass'y 22
3-36. C-roller arm ass'y, C-roller release lever 23

4. ADJUSTMENT

4-1. Tape path adjustment
  4-1-1. Tension regulator position/tension adjustement 24
  4-1-2. Height adjustment of the guide roller No.2 25
  4-1-3. Height adjustment of guide roller No. 7 and the RVS arm 25
  4-1-4. Height adjustment of guide rollers No.3 and No.6 26
  4-1-5. ACE head ass'y adjustment (rough adjustment) 26
  4-1-6. ACE head assembly adjustment (precision adjustment) 27
  4-1-7. X-value adjustment 27
  4-1-8. Adjustments after replacing the drum (video head) 29
  4-1-9. Checking the tension and torque 31

1. PREPARATIONS FOR CHECKS, ADJUSTMENTS AND REPLACEMENT OF THE DECK MECHANISM

Note : Refer to "Replacement Method" in the Service Guide for instructions on replacing the cabinet and PC boards. DO not perform cassette loading or threading with the VCR positioned upside-down.

1-1. LOADING AND UNLOADING VIDEO CASSETTES WITH THE POWER OFF. (Fig. 1-1.)

1-1-1. Manual loading and unloading

1) Rotate the loading motor in the direction of arrow Ⓐ until loading is compleated.
   (When unloading, rotate the loading motor in the direction of arrowⒷ.)

1-1-2. Loading and unloading using a separate power source.

1) Cassette loading is performed by applying approx. 10V (300 mA) to the power terminal of the loading motor using a stabilized DC power source.
   (When unloading, apply the same voltage to the opposite polarity of the power terminal.)

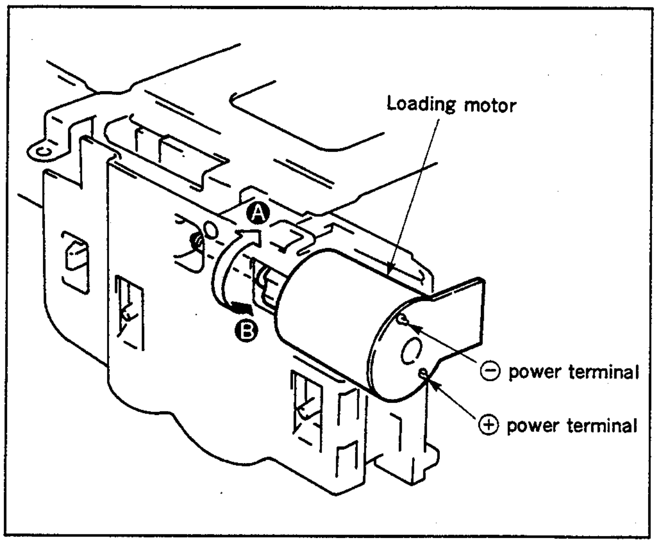


Fig. 1-1.

1-2. THREADING AND UNTHREADING WITH THE POWER OFF. (Fig. 1-2)

1-2-1. Manual threading and unthreading

1) Rotate the cam motor ❶ in the direction of arrowⒶuntil threading is completed.
   (When unthreading, rotate the cam motor ❶ in the direction of arrowⒷ.)

1-2-2. Threading and unthreading using a separate power source.

1) Threading is performed by applying approx. 10V (500 mA) to the power terminal for the cam motor ❶ using a DC stabilized power source.
   (When unthreading, apply the same voltage to the opposite polarity of the power terminal.)

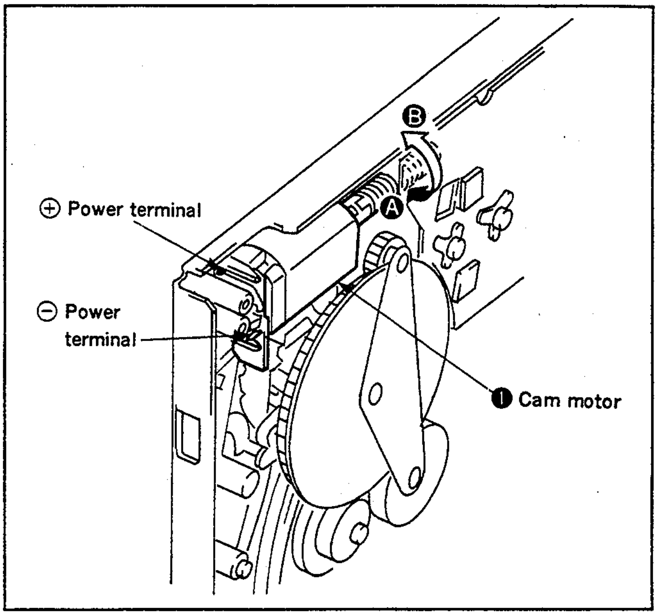


Fig. 1-2.

1-3. TO COMPLETE THREADING WITH THE FL CASSETTE CONTROLLER REMOVED. (Fig. 1-3)

1) Unplug the AC power cord from the power outlet.
2) Shield the supply, take-up sensors and the LED with black-masking tape.
3) Hold the cassatte down switch depressed by taping it, etc.
4) Plug the AC power cord into a power outlet.
(At this time, the power should turn on and the tape rewinds for approx. 10 seconds, and the power turns off.)
5) Turn the power switch ON so that the mechanism is ready for loading.

Note : In this condition, the VTR is ready to operate in the different operating modes, including the record mode. At this time, rewind the tape for at least 15 seconds, then perform fast forward (FF).

Note : Following the above, be sure to reset the mechanism to the previous state as outlined below.

1) Remove the black-masking tape shielding the supply and take-up sensors, the LED and the tape holding cassette down switch.
2) Unplug the AC power cord from the power outlet to reset the system control microprocessor.

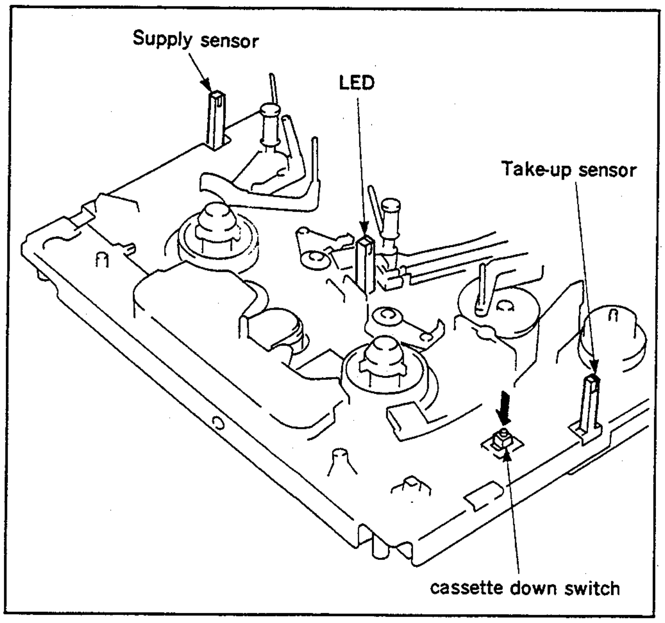


Fig. 1-3.

2. PERIODICAL INSPECTION AND REPLACEMENT

We recommend performing the following periodical inspections and maintenance in order to ensure that the unit operates in top condition and offers full performance, as well as realizes a long life of the mechanism and tapes.

* Be sure to perform the following maintenance procedures after the unit is repaired (regardless how long the unit has been used.)

2-1. CLEANING THE ROTARY HEAD DISC ASS'Y

1) Press Attach a deer skin cloth (Jig. Ref. No. J-7) soaked in cleaning solution (Jig. Ref. No. J-5) lightly to the rotary drum ass'y, then turn the rotary head disc slowly by hand to clean the surface of the rotary drum ass'y. (At this time, do not turn on the power motor to rotate the rotary head disc for cleaning.)
2) Also, do not wipe the drum ass'y by moving the deer skin cloth vertically across the head as this could damage of the tip of the head.

2-2. CLEANING THE TAPE TRANSPORT SYSTEM

1) Clean the tape transport surfaces (tape guide, a drum ass'y surfaces, capstan, pinch roller, etc.) with a deer skin cloth soaked in an approved in the recommended cleaning solution.

2-3. CLEANING THE DRIVE SYSTEM

1) Wipe the drive mechanism with an ordinary cloth soaked in an approved cleaning solution.

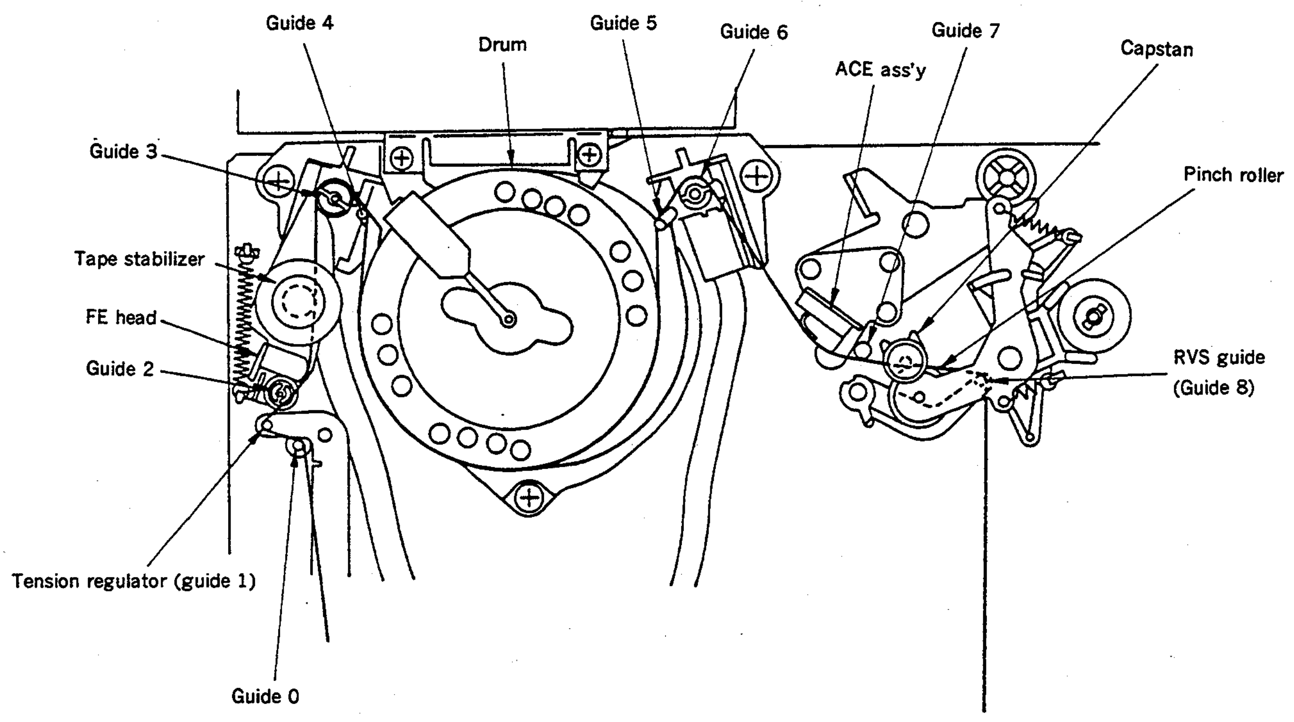

Guide 4
Drum
Guide 5
Guide 6
Guide 7
ACE ass'y
Capstan
Guide 3
Pinch roller
Tape stabilizer
FE head
Guide 2
RVS guide
(Guide 8)
Tension regulator (guide 1)
Guide 0

Fig. 2-1.

2-4. PERIODIC MAINTENANCE

Location of Maintenance and Check		User Hours	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
		Replacement Part No.											
Perfor mance Check	Clean tape running surfaces	——	○	○	○	○	○	○	○	○	○	○	Always perform after repair.
	Clean, degauss ACE ass'y	——	○	○	○	○	○	○	○	○	○	○	
	Clean, degauss video disc ass'y	——	○	○	○	○	○	○	○	○	○	○	Head life is greatly affected by environment and method of use.
Driving System	Reel belt	3-736-013-01	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Always perform after repair.
Tape Running System	Abnormal noise	——	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace source of abnormal noise.
	Back tension measurement	——	–	☆	–	☆	–	☆	–	☆	–	☆	Check according to 4-1-1. Spec : 24 — 34g/cm (Measured with torque cassette)
	Brake system check	——	–	☆	–	☆	–	☆	–	☆	–	☆	
	REC/PB function check	——	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Always perform after repair.
	Forward torque measurement		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Spec : 80 — 140 g•cm

○ Cleaning ☆ Check

Note : Refer to the above items for part replacement when performing an overhaul.

2-5. SERVICE TOOLS AND JIGS

Ref. No.	Description	Part No.	Printing on jig	Remarks
J-1	Master plane	H-7099-279-H		
J-2	Reel disc height jig	H-7099-038-H		
J-3	Torque gauge adapter	H-7099-035-H		
J-4	Torque gauge	H-7099-039-H		
J-5	0.93mm Allen wrench	H-7099-202-H		
J-6	NTSC torque cassette VHT-063S PAL torque cassette	J-6082-011-A J-6082-066-A		For rewind torque and back tension
	NTSC torque cassette VHT-404S PAL torque cassette	J-6082-012-A J-6082-067-A		For cue/review
J-7	NTSC alignment tape JVC-MH-1 PAL alignment tape JVC-MH-2	H-7099-046-H H-7099-052-H		
	NTSC Hi-Fi alignment tape PAL Hi-Fi alignment tape	H-7099-153-H H-7099-175-H		
J-8	Cleaning fluid	Y-2031-001-0	———	
J-9	Chamois cloth	2-034-697-00	———	Cleaning
J-10	Head degausser	Widely available	———	Video, audio head degaussing
J-11	Small adjustment mirror (with handle) Small adjustment mirror (mirror only)	J-6080-029-A J-6080-030-1	SL-5052	For tape path and tape running adjustment and check

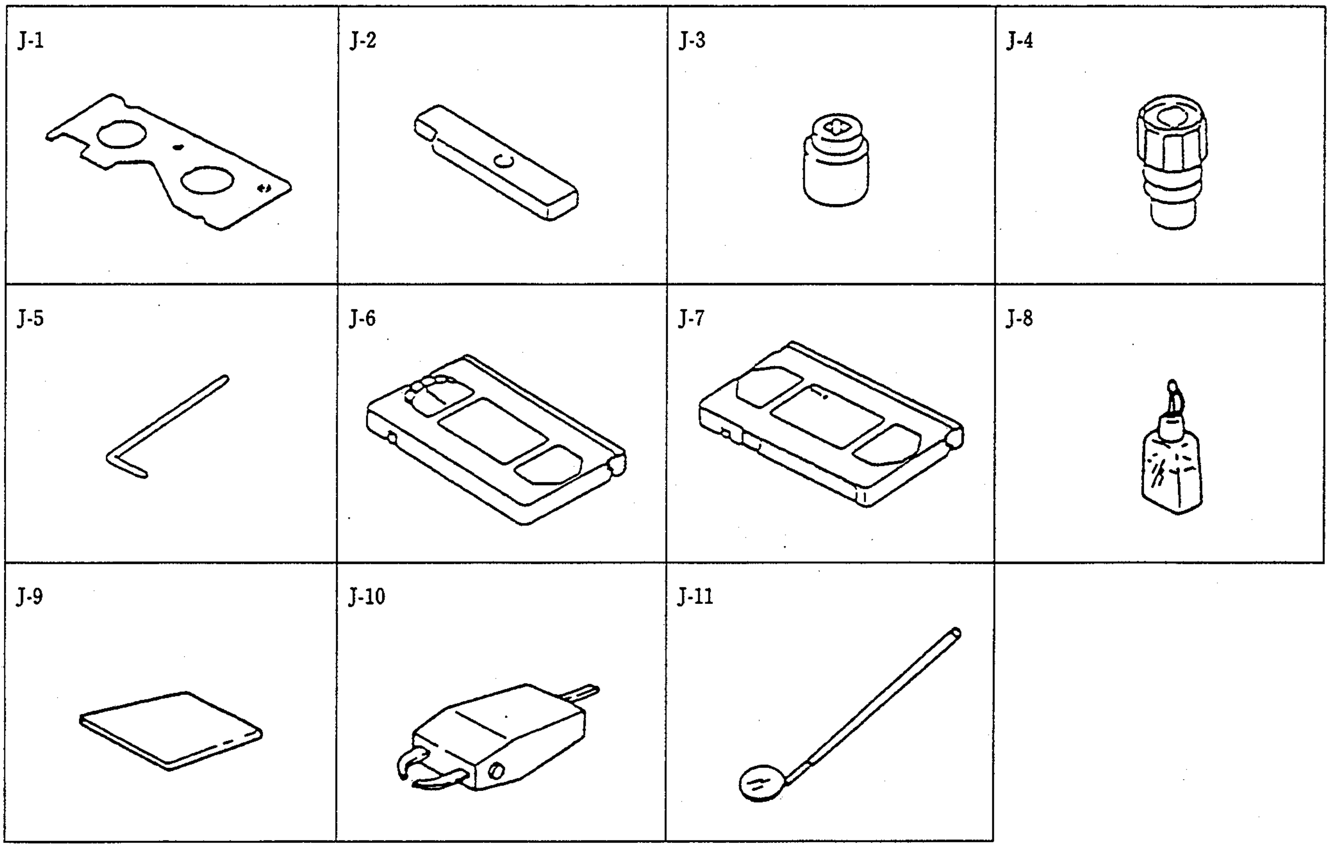


Fig. 2-2. Service tools and jigs

3. REPLACEMENT OF MAJOR COMPONENT PARTS OF THE DECK MECHANISM

Note:
- ○ Refer to "Replacement Method" in the Service Guide for replacing the cabinet and PC boards.
- ○ When mounting parts, reverse the replacement procedure while referring to "Precautions on Mounting Parts".
- ○ After grease coated parts such as gears are replaced, re-grease the replaced part.
- ○ Do not touch the guides (taped surface) and brake shoe directly with your fingers or grease them, etc.
- ○ Gears must be mounted so that they mesh with each other.

3-1. FL MECHANISM

3-1-1. FL door (Fig. 3-1.)

1) Press the claw ❶ in the direction of arrow Ⓐ, then remove the FL door ❷ in the direction of arrow Ⓑ.

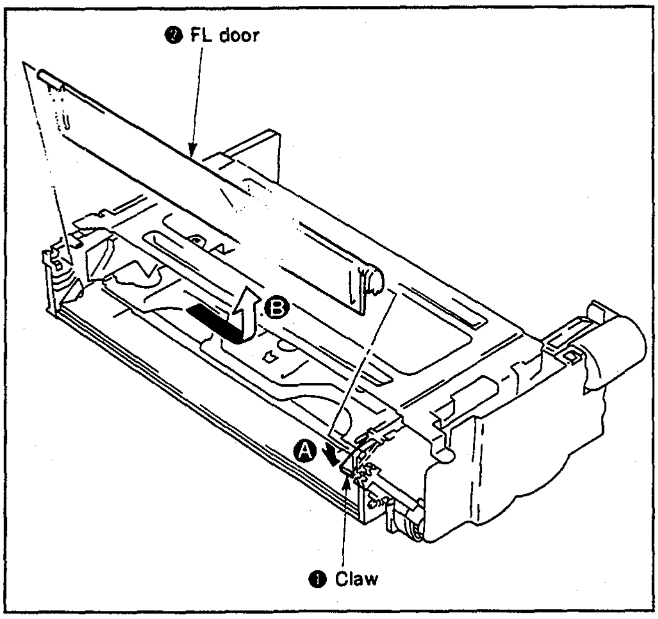

❷ FL door
Ⓑ
Ⓐ
❶ Claw

Fig. 3-1.

3-1-2. Erasure protection lever (Fig. 3-2)

1) Remove the spring ❶.
2) Disengage the claw ❷, then slide the erasure protection lever ❸ in the direction of arrow Ⓐ.
3) Disengage the erasure protection lever ❸ in the direction of arrow Ⓑ.

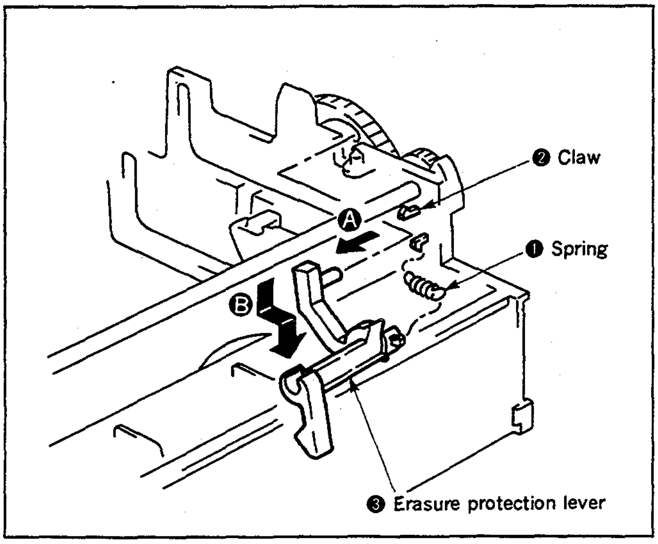

❷ Claw
Ⓐ
❶ Spring
Ⓑ
❸ Erasure protection lever

Fig. 3-2.

3-1-3. Gear cover ass'y (Fig. 3-3)

1) Disengage the four claws ❶, then remove the gear cover ass'y ❷.

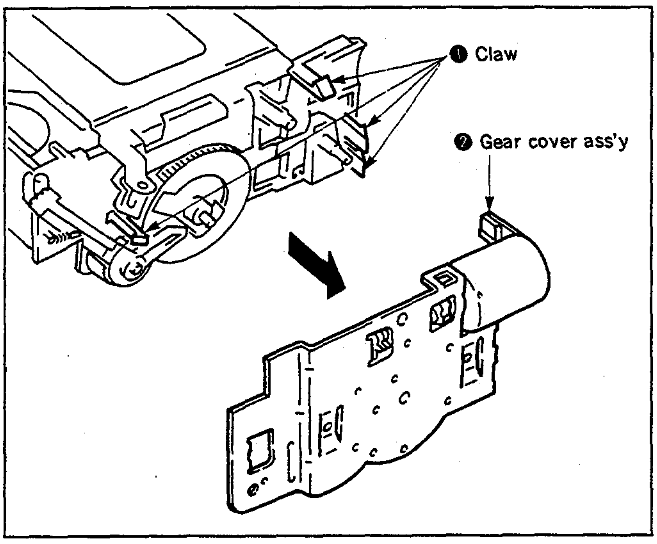

❶ Claw
❷ Gear cover ass'y

Fig. 3-3.

3-1-4. Loading motor, worm gear (FL), worm wheel (FL), worm bearing (Fig. 3-4)

1) Remove washer 3 ❶, then pull out the worm wheel (FL) ❷.
2) Remove the two screws ❸, then remove the loading motor ❹.
3) Remove the worm gear (FL) ❺ and worm bearing ❻.

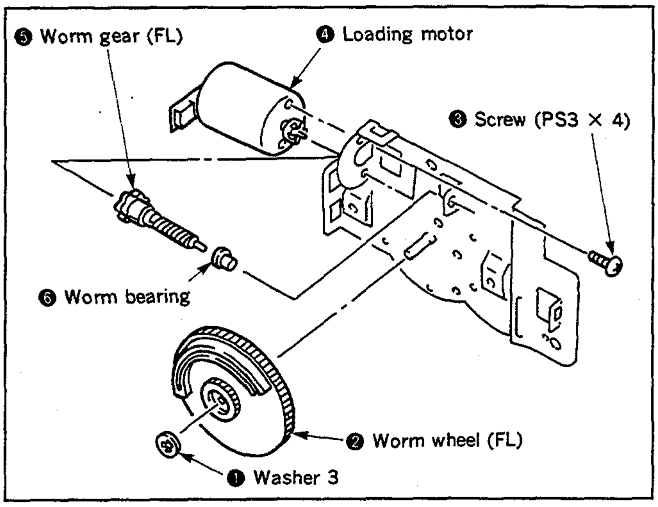

❺ Worm gear (FL)
❹ Loading motor
❸ Screw (PS3 × 4)
❻ Worm bearing
❷ Worm wheel (FL)
❶ Washer 3

Fig. 3-4.

3-1-5. Door OPEN/CLOSE arm (Fig. 3-5)

1) Remove the spring ❶.
2) Pull out the door OPEN/CLOSE arm ❷.

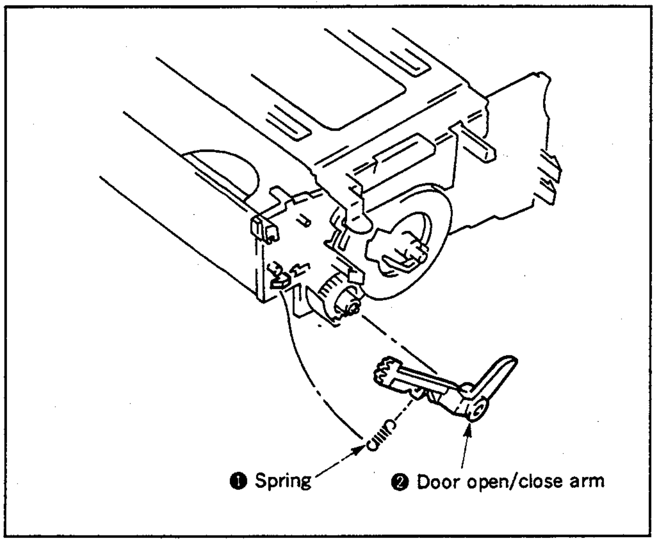

❶ Spring
❷ Door open/close arm

Fig. 3-5.

[Precautions on remounting] (Figs. 3-6 and 3-7.)

- ○ When mounting the gear cover ass'y, match up the two holes on the gear cover ass'y with the two holes on the worm wheel (FL) and then with the hole on the right drive arm ass'y.
- ○ Mesh the FL door and the door OPEN/CLOSE arm together as shown in Ⓐ section in the figure below.
- ○ The erasure protection lever shaft must fit into the groove on the left drive arm ass'y.

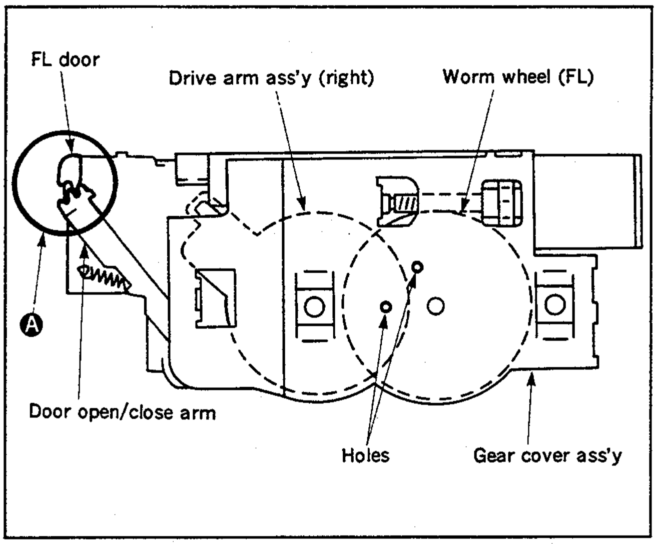

FL door
Drive arm ass'y (right)
Worm wheel (FL)
Ⓐ
Door open/close arm
Holes
Gear cover ass'y

Fig. 3-6.

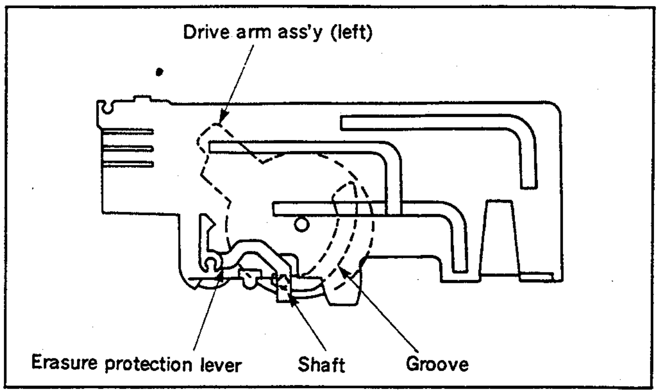

Drive arm ass'y (left)
Erasure protection lever
Shaft
Groove

Fig. 3-7.

3-2. TS ASS'Y AND GUIDE ROLLER ASS'Y No. 2 (Fig. 3-8)

1) Remove the spring ❶.
2) Remove the TS ass'y ❷ in the direction of arrow Ⓐ.
3) Turn guide roller ass'y No. 2 ❸ in the direction of arrow Ⓑ and pull it out.

[Precautions on remounting]

- ○ Clean the surface of guide roller No. 2 ❸ where the tape is attached.
- ○ Apply lubricant over the section shown in Figure A below.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

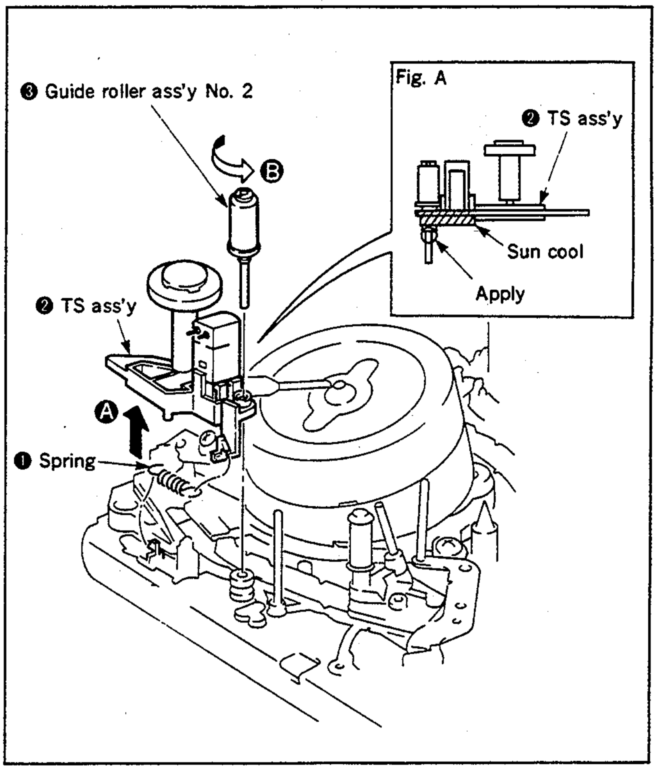

❸ Guide roller ass'y No. 2
Ⓑ
❷ TS ass'y
Ⓐ
❶ Spring
Fig. A
❷ TS ass'y
Sun cool
Apply

Fig. 3-8.

3-3. ACE ASS'Y (Fig. 3-9)

1) Slide the torsion coil spring ❶ in the direction of the arrow.
2) Remove the nylon nut N3 ❷, then pull out the ACE ass'y ❸.
3) Remove the ACE adjuster screw ❹.

[Precautions on remounting]

- ○ Clean the surface of the ACE ass'y ❸ where the tape is attached.
- ○ Hook both ends of the torsion coil spring ❶ to the ass'y as shown in Figure A below.
- ○ Adjust the ACE adjuster screw ❹ to the height shown in Figure A.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

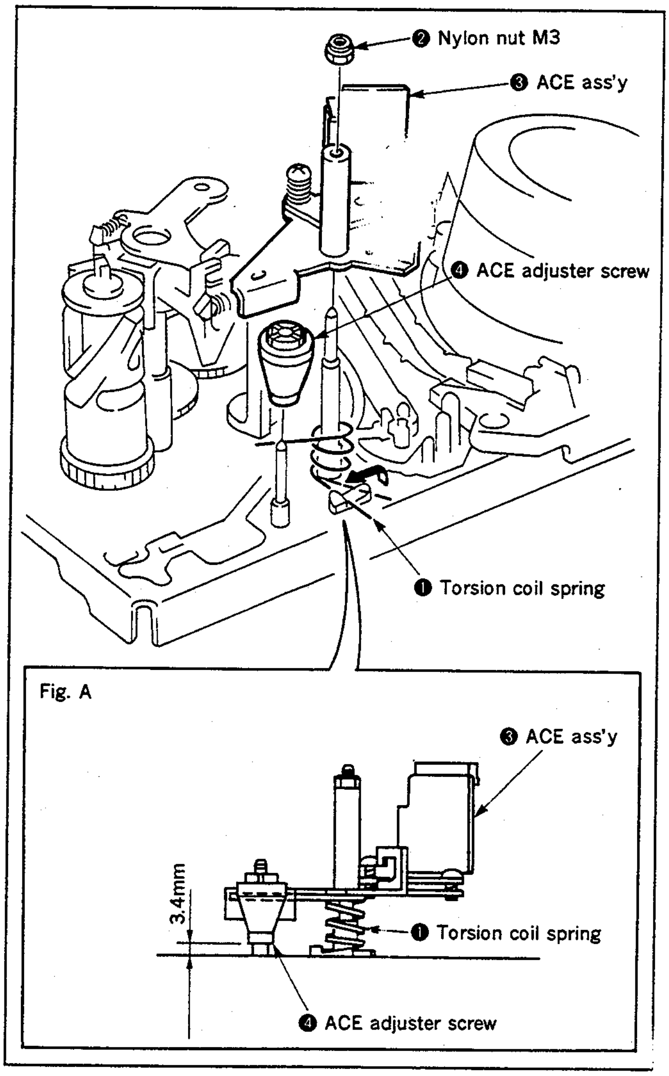

❷ Nylon nut M3
❸ ACE ass'y
❹ ACE adjuster screw
❶ Torsion coil spring
Fig. A
❸ ACE ass'y
3.4mm
❶ Torsion coil spring
❹ ACE adjuster screw

Fig. 3-9.

3-4. DRUM ASS'Y (Fig. 3-10)

1) Remove the three screws ❶, then remove the drum ass'y ❷.

[Precautions on remounting]

- ○ Do not touch the head tips ❸ and the ground plate ❹ directly with your fingers or tools.
- ○ Clean the surface of the drum ass'y ❷ where a tape is attached.
- ○ The stopper ❺ must be attached at the point shown in the figure below.
- ○ Screws must be fastened with a 6kg•cm (±1kg•cm) screw fastening torque. (The screws can be mounted in any order.)

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

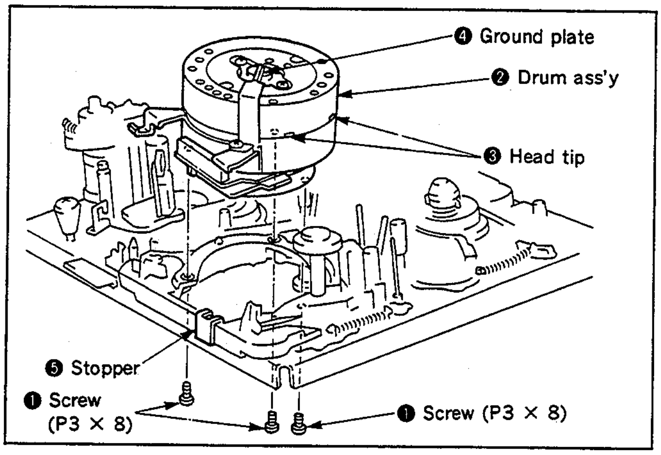

❹ Ground plate
❷ Drum ass'y
❸ Head tip
❺ Stopper
❶ Screw (P3 × 8)
❶ Screw (P3 × 8)

Fig. 3-10.

3-5. DRUM BASE ASS'Y (Fig. 3-11)

1) Remove the drum. (Refer to 3-4.)
2) Remove the three screws ❶, then remove the drum base ass'y ❷.

[Precautions on remounting]

- ○ The spacer ❸ for the drum base must be mounted in its previous position as shown in the figure below. (Note that some units do not feature the spacer ❸.)
- ○ Fastening torque must be 10kg•cm (±1kg•cm)
- ○ The screws must be mounted in order of (a),(b) and (c).

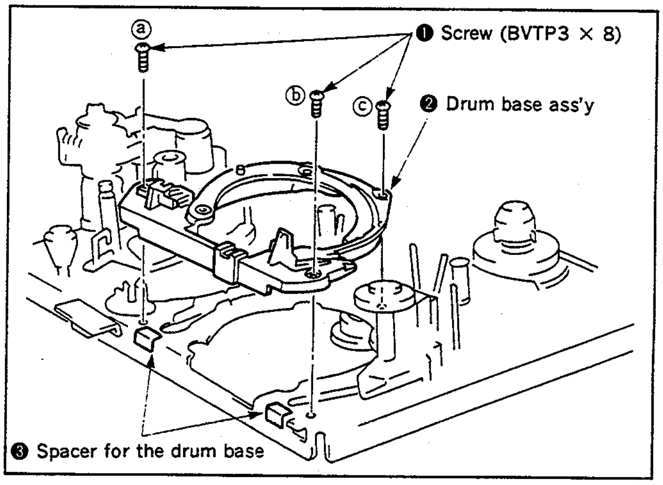

ⓐ
ⓑ
ⓒ
❶ Screw (BVTP3 × 8)
❷ Drum base ass'y
❸ Spacer for the drum base

Fig. 3-11.

3-6. PINCH ROLLER ASS'Y AND ELEVATOR CAM (Fig. 3-12)

1) Remove the two claws ❶, then pull out the stopper ❷.
2) Pull out the pinch roller ass'y ❸.
3) Pull out the elevator cam ❹.

[Precautions on remounting]

- ○ Clean the surface of the pinch roller ass'y ❸ where the tape is attached.
- ○ Match up the ▯ marks on the elevator cam ❹ and cam gear, press ❺.

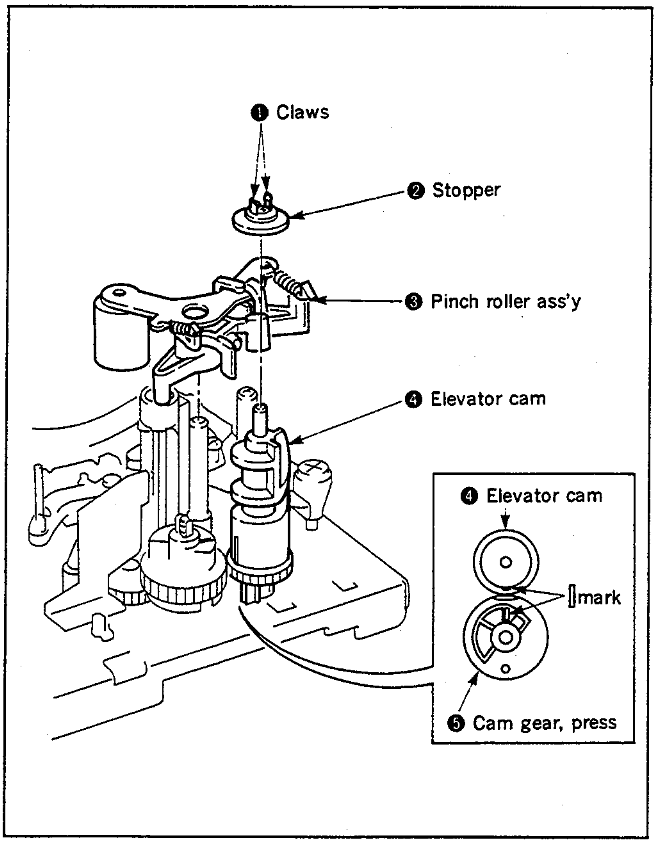

❶ Claws
❷ Stopper
❸ Pinch roller ass'y
❹ Elevator cam
❹ Elevator cam
▯mark
❺ Cam gear, press

Fig. 3-12.

3-7. CAM GEAR, PRESS AND TRANSMISSION GEAR (Fig. 3-13)

1) Remove the pinch roller ass'y. (Refer to 3-6.)
2) Remove the screw ❶, then remove the lid release plate ❷.
3) Remove the two claws ❸, then pull out the cam gear, press ❹.
4) Remove the washer 2 ❺, then pull out the transmission gear ❻.

[Precautions on remounting]

- ○ Check the top and bottom of the transmission gear ❻.
- ○ Match up the hole ❼ on the chassis with the hole ❼ on the cam gear, press ❹.
- ○ Match up the ▯ mark on the cam gear, press ❹ with the ▯ mark on the alleviator cam ❽.

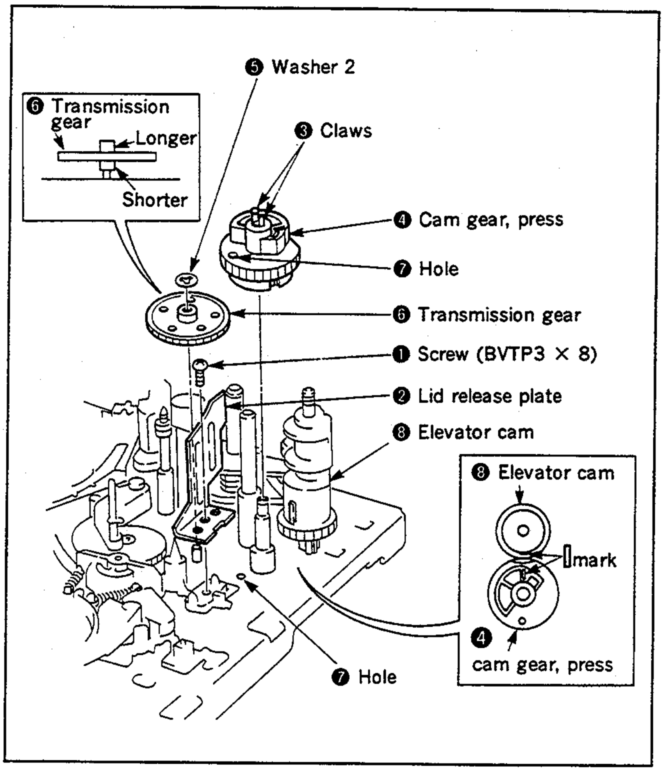

❺ Washer 2
❻ Transmission gear
Longer
Shorter
❸ Claws
❹ Cam gear, press
❼ Hole
❻ Transmission gear
❶ Screw (BVTP3 × 8)
❷ Lid release plate
❽ Elevator cam
❽ Elevator cam
▯mark
❹ cam gear, press
❼ Hole

Fig. 3-13.

3-8. RVS ARM ASS'Y AND RVS CAM GEAR (Fig. 3-14)

1) Remove the nylon nut M2 ❶ and plastic washer ❷.
2) Disengage the claw ❸, then pull out the RVS arm ass'y ❹.
3) Remove washer 2 ❺, then pull out the RVS cam gear ❻.

[Precautions on remounting]

- ○ The holes ❼ in the chassis and in the RVS cam gear ❻ must match up. Also, make sure to match up the holes ❾ on the cam gear, press ❽ and the chassis.
- ○ The spring ❿ must be hooked as shown in Fig. A below.
- ○ Clean the surface of the RVS arm ass'y ❹ where a tape is attached.
- ○ Apply 1/2 drop of lubricant to the shaft ⓫.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

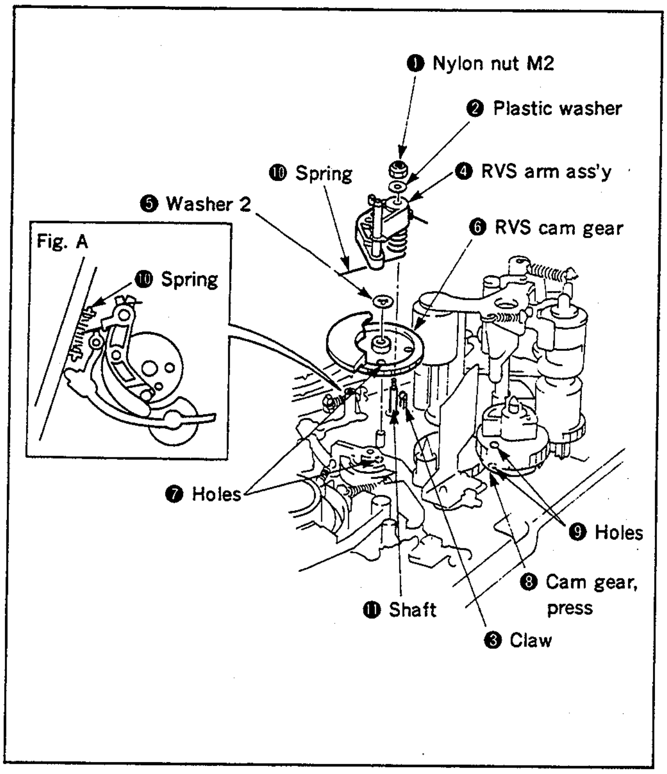

❶ Nylon nut M2
❷ Plastic washer
❿ Spring
❹ RVS arm ass'y
❺ Washer 2
❻ RVS cam gear
Fig. A
❿ Spring
❼ Holes
❾ Holes
❽ Cam gear, press
⓫ Shaft
❸ Claw

Fig. 3-14.

3-9. GUIDE No. 7 (Fig. 3-15)

1) Remove the nylon nut M3 ❶.
2) Pull out guide flange No. 7 ❷, guide sleeve No. 7 ❸, guide flange No. 7 ❹ and compression coil spring ❺ in the given order.

[Precautions on remounting]

- ○ Clean the surface of the guide sleeve No. 7 ❸ where the tape is attached.
- ○ Adjust the height of guide No. 7 to the height shown in Fig. A below.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

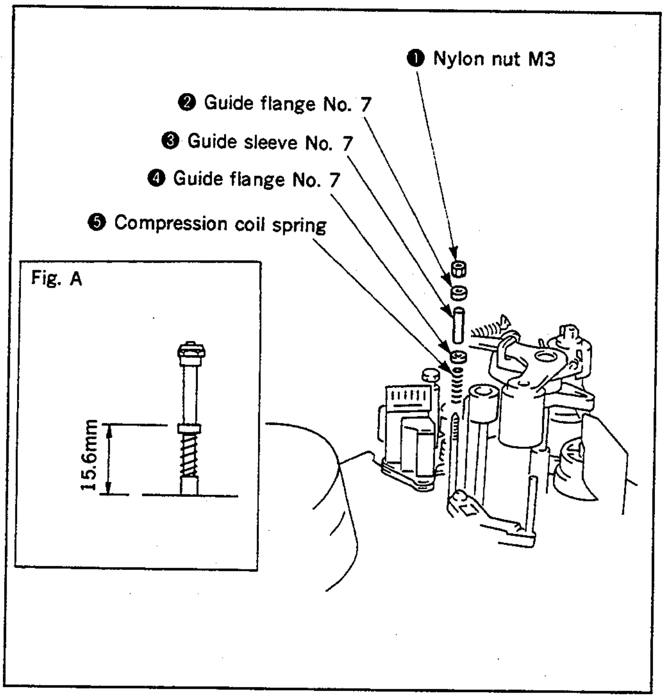

❶ Nylon nut M3
❷ Guide flange No. 7
❸ Guide sleeve No. 7
❹ Guide flange No. 7
❺ Compression coil spring
Fig. A
15.6mm

Fig. 3-15.

3-10. S-BRAKE ASS'Y, T-BRAKE ASS'Y (Fig. 3-16)

1) Remove the spring ❶.
2) Disengage the claw ❷, then pull out the S-brake ass'y ❸.
3) Disengage the claw ❹, then pull out the T-brake ass'y ❺.

[Precautions on remounting]

- ○ Do not touch the brake shoes for the respective S-brake ❸ and T-brake ❺ assy's directly with your fingers.
- ○ Do not hold on to the S-brake ❸ and T-brake ❺ assy's by the arms when inserting them.
- ○ The T-brake ass'y ❺ must be positioned above the S-brake ass'y ❸ as shown in Fig. A below.

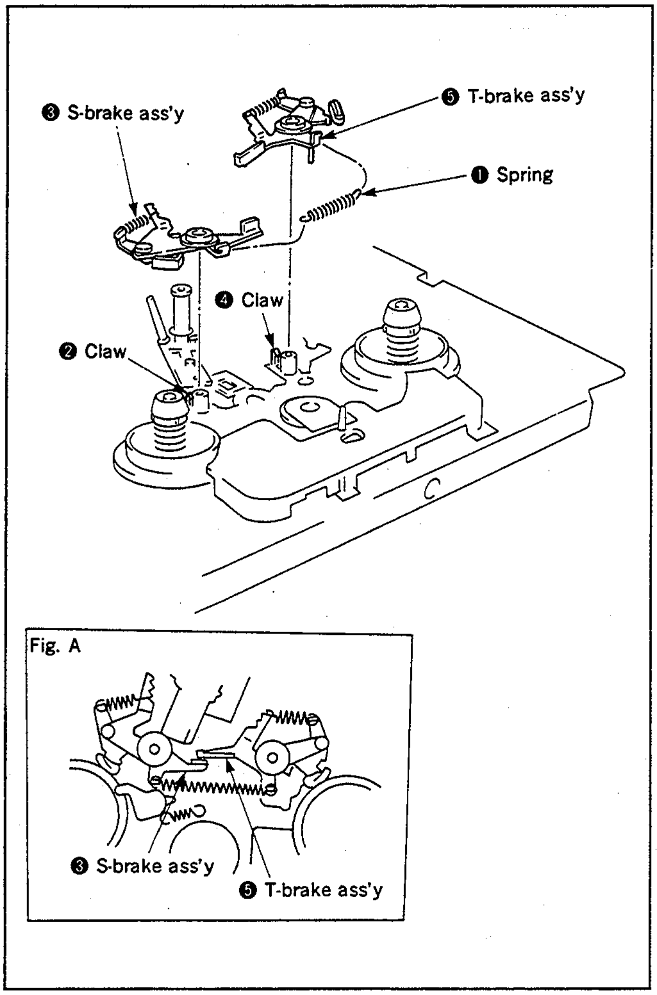

❸ S-brake ass'y
❺ T-brake ass'y
❶ Spring
❹ Claw
❷ Claw
Fig. A
❸ S-brake ass'y
❺ T-brake ass'y

Fig. 3-16.

3-11. T-SOFT BRAKE ASS'Y REV BRAKE ARM (Fig. 3-17)

1) Remove the end of the spring ❶ from the REV brake arm ❷.
2) Remove the end of the spring ❸ from the chassis.
3) Disengage the claw ❹, then pull out the T-soft brake ass'y ❺.
4) Disengage the claw ❻, then pull out the REV brake arm ❷.

[Precautions on remounting]

- ○ Do not touch the brake shoe of the T-soft brake ass'y ❺ directly with your fingers.

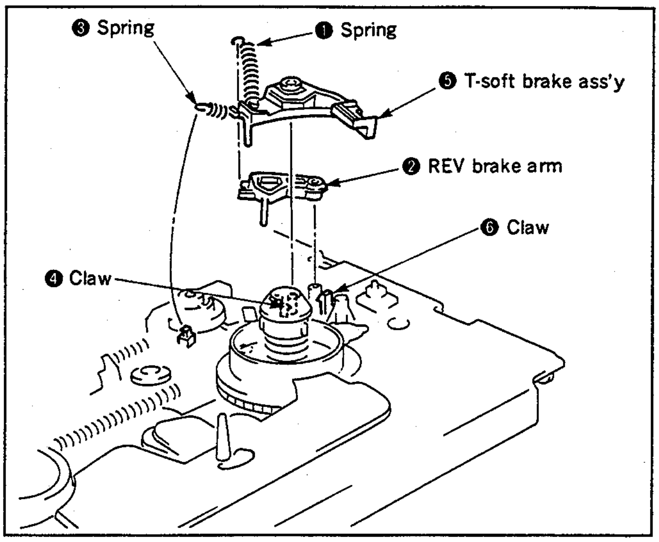

❸ Spring
❶ Spring
❺ T-soft brake ass'y
❷ REV brake arm
❻ Claw
❹ Claw

Fig. 3-17.

3-12. S-SOFT BRAKE ARM ASS'Y (Fig. 3-18)

1) Unhook the end of the spring ❶ from the chassis.
2) Disengage the claw ❷, then pull out the S-soft brake arm ass'y ❸.

[Precautions on remounting]

- ○ The S-soft brake arm ass'y must not clamp down the tension regulator band ass'y ❹ nor be positioned below the tension regulator band ❹.

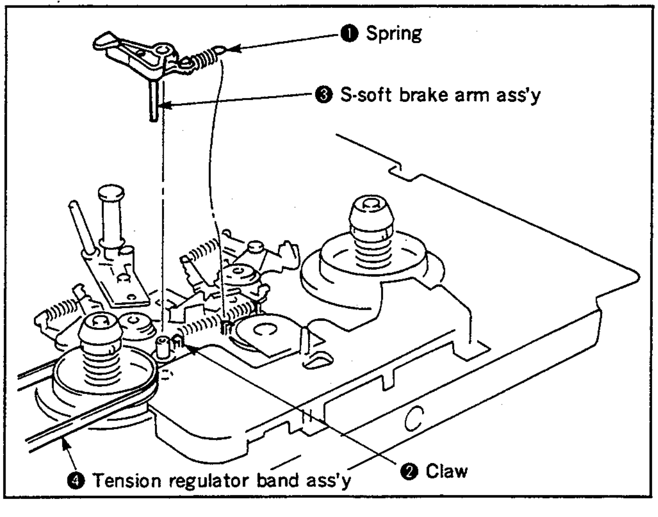

❶ Spring
❸ S-soft brake arm ass'y
❹ Tension regulator band ass'y
❷ Claw

Fig. 3-18.

3-13. S-GUIDE AND T-GUIDE ROLLER ASSY'S (Fig. 3-19)

1) Loosen the setscrew ❶, then remove the S-guide roller ass'y ❷ by turning it in the direction of the arrow Ⓐ.
2) Loosen the setscrew ❸, then remove the T-guide roller ass'y ❹ by turning it in the direction of arrow Ⓑ.

[Precautions on remounting]

○ Clean the surfaces of the S-guide roller ❷ and T-guide roller assy's ❹ where a tape is attached.

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

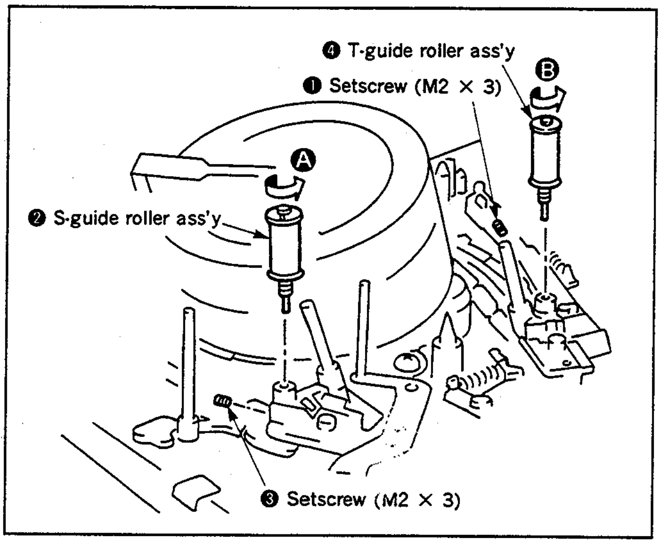

❹ T-guide roller ass'y
❶ Setscrew (M2 × 3)
Ⓑ
Ⓐ
❷ S-guide roller ass'y
❸ Setscrew (M2 × 3)

Fig. 3-19.

3-14. REEL LOCK RELEASE AND REW GEAR (Fig. 3-20)

1) Disengage the two claws ❶, then remove the reel lock release ❷ along with the spring ❸ (while the spring is still attached).
2) Next, pull out the REW gear ❹ with the spring bearing ❺ still attached).

[Precautions on remounting]

○ Make sure that the small thrust bearing ❻ remains attached.

○ Make sure that the two claws ❶ lock the real lock release ❷ in place.

○ Apply 1/2 drop of lubricant to the shaft ❼.

○ Make sure that the spring ❸ adheres to the reel lock release ❷ and that it fits inside the rib of the REW gear ❹.

○ Mount the REW gear ❹ by meshing it with gear ❽.

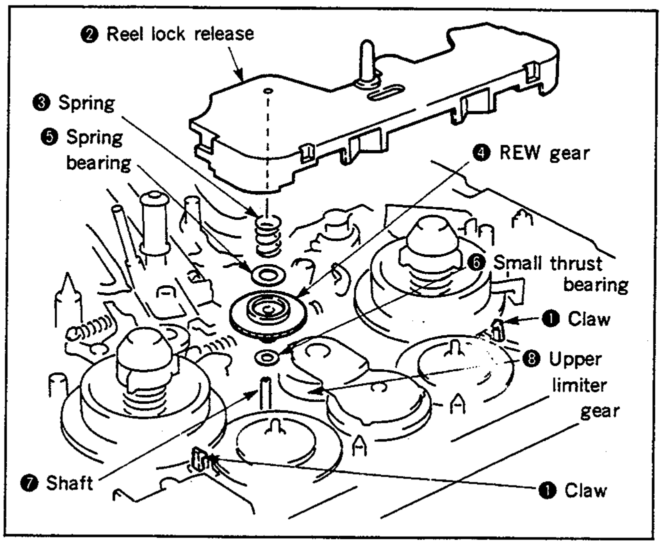

❷ Reel lock release
❸ Spring
❺ Spring bearing
❹ REW gear
❻ Small thrust bearing
❶ Claw
❽ Upper limiter gear
❼ Shaft
❶ Claw

Fig. 3-20.

3-15. TENSION REGULATOR ARM ASS'Y, TENSION REGULATOR BAND ASS'Y (Fig. 3-21)

1) Remove the reel lock release ass'y. (Refer to Fig. 3-14.)
2) Disengage the three claws marked ❶ and the claw marked ❷, then remove the tension regulator band ass'y ❸.
3) Unhook the end of the spring ❹ from the chassis.
4) Disengage the claw ❺, then pull out the tension regulator arm ass'y ❻.

[Precautions on remounting]

- ○ Roll up the tension regulator band ❸ on the S-reel by turning the S-soft brake arm ass'y ❼ in the direction of the arrow.
- ○ Hook the spring ❹ at the center of the spring hook ❽.
- ○ Do not touch the brake shoe of the tension regulator band ass'y ❸ directly with your fingers.
- ○ Mount the tension regulator arm ass'y ❻ at the position shown in Fig. A below.

[Adjustment after replacement]

- ○ Check the back tension. (Refer to 4-1-1.)
- ○ Perform tape path adjustments as described in 4-1.

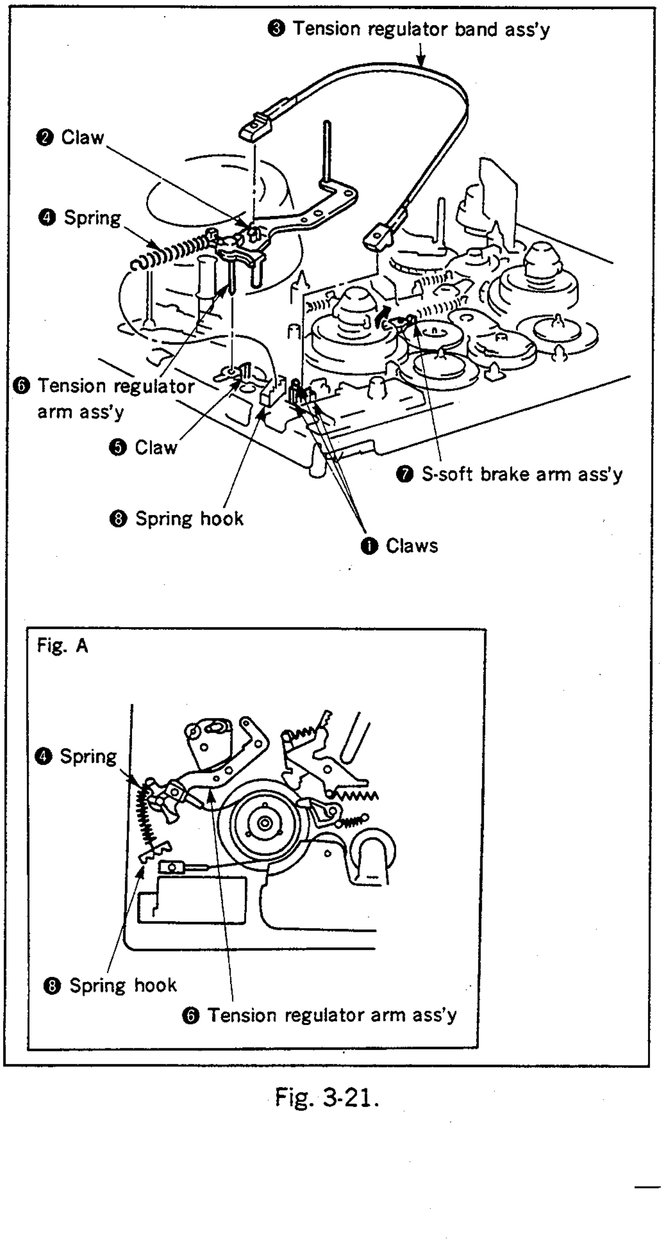

❸ Tension regulator band ass'y
❷ Claw
❹ Spring
❻ Tension regulator arm ass'y
❺ Claw
❼ S-soft brake arm ass'y
❽ Spring hook
❶ Claws
Fig. A
❹ Spring
❽ Spring hook
❻ Tension regulator arm ass'y

Fig. 3-21.

3-16. S TAKE-UP ASS'Y (Fig. 3-22)

1) Remove the tension regulator arm ass'y and the tension regulator band ass'y. (Refer to 3-15.)
2) Unhook the end of the spring ❶ from the S take-up arm ❷.
3) Disengage the two claws ❸, then remove the S take-up ass'y ❹.

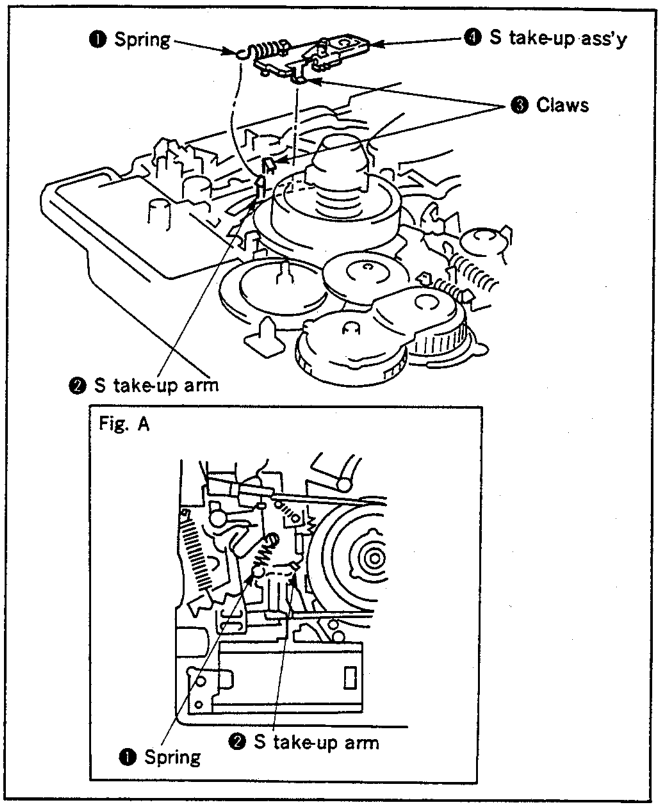

❶ Spring
❹ S take-up ass'y
❸ Claws
❷ S take-up arm
Fig. A
❶ Spring
❷ S take-up arm

Fig. 3-22.

3-17. S-REEL ASS'Y (Fig. 3-23)

1) Remove the S-soft brake arm ass'y. (Refer to 3-12.)
2) Remove the reel lock release. (Refer to 3-14.)
3) Remove the tension regulator band ass'y. (Refer to 3- 15.)
4) Turn the S-brake ass'y ❶ in the direction of the arrow.
5) Pull out the S-reel ass'y ❷.

[Precautions on remounting]

- ○ At least one reel stand thrust bearing ❸ must be attached (but not more than two).
- ○ Do not touch the outer edge of the S-reel ass'y ❷ directly with your fingers.
- ○ Apply 1/2 drop of lubricant over the shaft ❹.
- ○ Mount the S-reel ass'y ❷ while meshing it with the relay gear ❺.

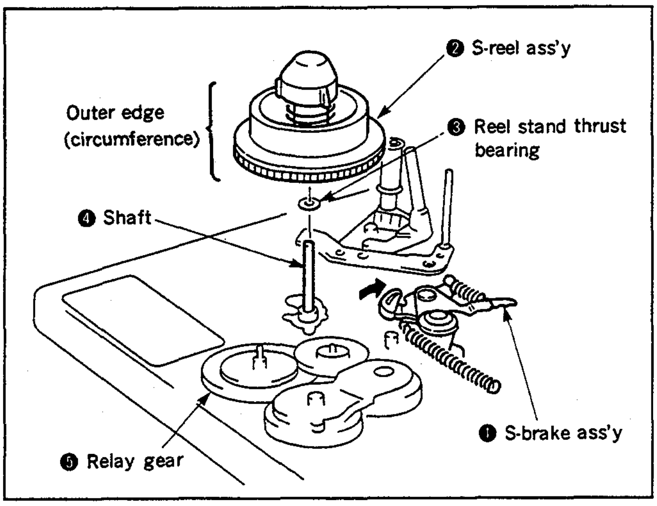

❷ S-reel ass'y
Outer edge (circumference)
❸ Reel stand thrust bearing
❹ Shaft
❶ S-brake ass'y
❺ Relay gear

Fig. 3-23.

3-18. T-REEL ASS'Y (Fig. 3-24)

1) Remove the T-soft brake ass'y. (Refer to 3-11.)
2) Remove the reel lock release ass'y. (Refer to 3-14.)
3) Turn the T-brake ass'y ❶ in the direction of the arrow.
4) Pull out the T-reel ass'y ❷.

[Precautions on remounting]

- ○ At least one reel stand thrust bearing ❸ must be attached (but not more than two).
- ○ Do not touch the outer edge of the T-reel ass'y ❷ directly with your fingers.
- ○ Apply 1/2 drop of lubricant on the shaft ❹.
- ○ Mount the T-reel ass'y ❷ while meshing it with the relay gear ❺.

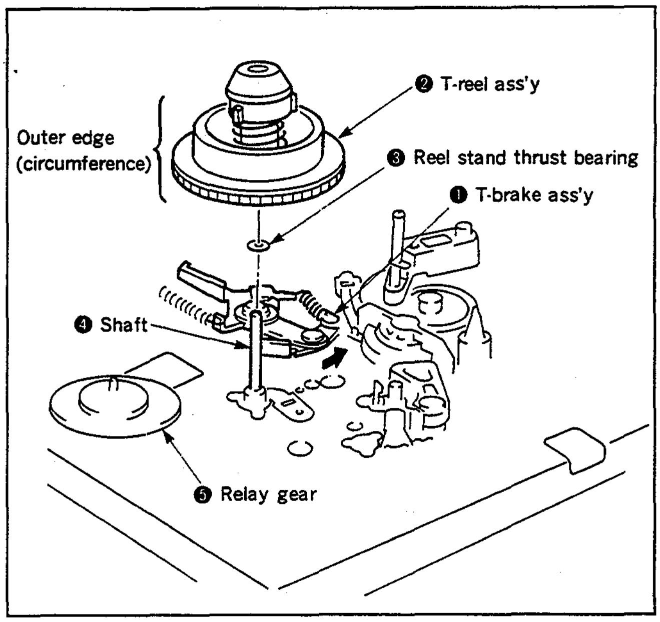

❷ T-reel ass'y
Outer edge (circumference)
❸ Reel stand thrust bearing
❶ T-brake ass'y
❹ Shaft
❺ Relay gear

Fig. 3-24.

3-19. PENDULUM ARM ASS'Y (Fig. 3-25)

1) Remove the reel lock release ass'y. (Refer to 3-14.)
2) Remove the washer 2 ❶, then pull out the pendulum arm ass'y ❷.

[Precautions on remounting]

- ○ Fit the boss on the pendulum cap ❸ into the gap in the pendulum slide plate ❹.
- ○ The plastic slider ❺ must be attzched.
- ○ Apply 1/2 drop of lubricant on the shaft ❻.
- ○ Mount the pendulum arm ass'y ❷ by meshing it with the upper limiter gear ❼.

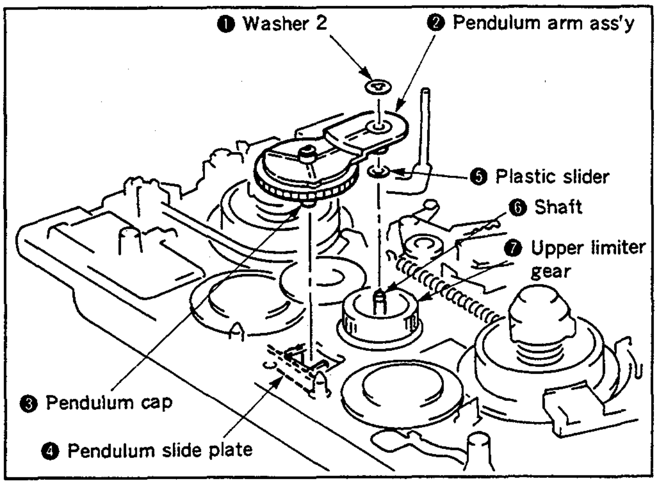

❶ Washer 2
❷ Pendulum arm ass'y
❺ Plastic slider
❻ Shaft
❼ Upper limiter gear
❸ Pendulum cap
❹ Pendulum slide plate

Fig. 3-25.

3-20. RELAY GEAR (Fig. 3-26)

1) Remove the reel lock release and REW gear. (Refer to 3-14.)
2) Remove the S-reel ass'y. (Refer to 3-17.)
3) Remove the T-reel ass'y. (Refer to 3-18).
4) Pull out the two relay gears ❶.

[Precautions on remounting]

- ○ The relay gears ❶ must rotate smoothly after remounting.
- ○ Apply 1/2 drop of lubricant to the respective shafts ❷.

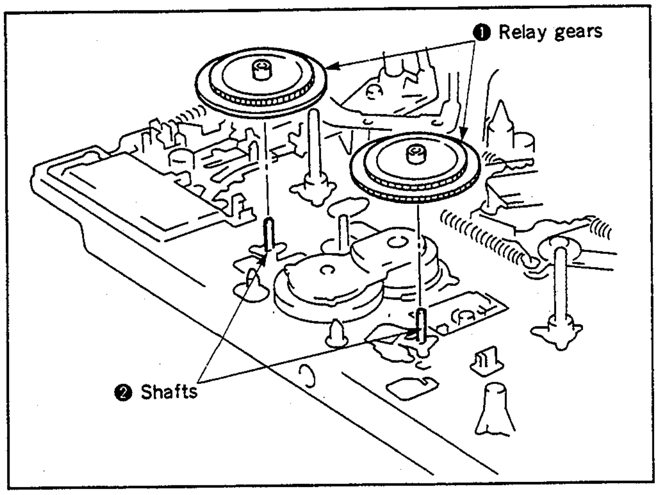

❶ Relay gears
❷ Shafts

Fig. 3-26.

3-21. ADJUSTER ARM ASS'Y (Fig. 3-27)

1) Remove screw ❶.
2) Remove washer ❻.
3) Remove the end of the spring ❷ hooked to the chassis.
4) Remove the end of the timing belt ❸ from the capstan motor arm ass'y.
5) Disengage the claw ❹, then remove the adjuster arm ass'y.

[Precautions on remounting]

- ○ First mount the adjuster arm ass'y ❺, timing belt ❸ and spring ❷, then attach the washer ❻ and fasten the screw ❶.
- ○ The screw fastening torque must be within 5kg•cm (±1kg•cm).

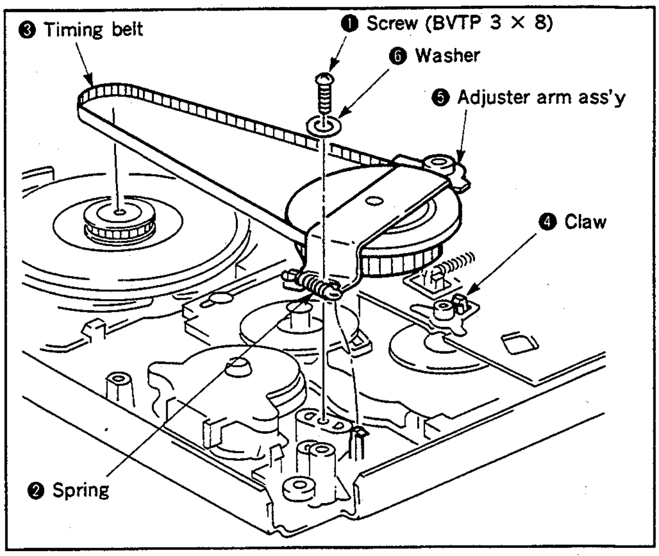

❸ Timing belt
❶ Screw (BVTP 3 × 8)
❻ Washer
❺ Adjuster arm ass'y
❹ Claw
❷ Spring

Fig. 3-27.

3-22. CAP BRAKE ASS'Y (Fig. 3-28)

1) Loosen the screw ❶, then push the timing belt ❷ in the direction of the arrow.
2) Unhook the end of the spring ❸ from the chassis.
3) Disengage claw ❹, then pull out CAP brake ass'y ❺.

[Precautions on remounting]

- ○ Do not touch the brake shoe of the CAP brake ass'y ❺ directly with your fingers.

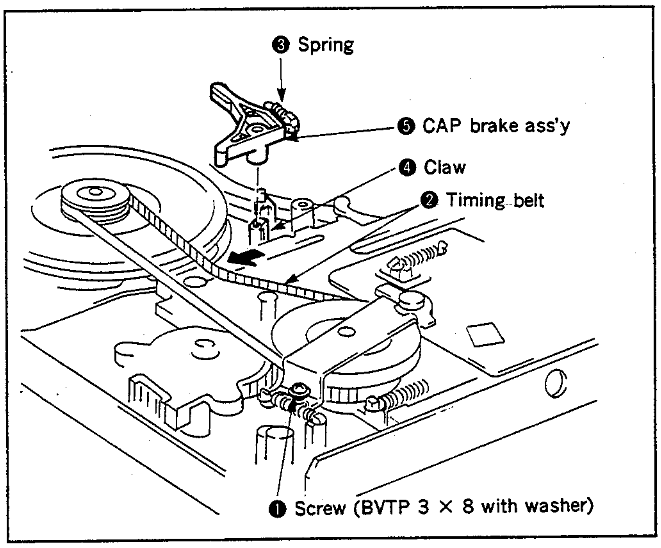

❸ Spring
❺ CAP brake ass'y
❹ Claw
❷ Timing belt
❶ Screw (BVTP 3 × 8 with washer)

Fig. 3-28.

3-23. CAPSTAN MOTOR (Fig. 3-29)

1) Turn the ACE ass'y ❶ in the direction of arrow Ⓐ as shown in Fig. A below, then remove three screws ❷.
2) Remove screw ❸, then remove the rotor clamp ❹.
3) Turn the CAP brake ass'y ❺ in the direction of arrow Ⓑ, then pull out the capstan motor ❻.

[Precautions on remounting]

- ○ Clean the section of the capstan motor ❻ where the tape is attached.
- ○ Do not touch the brake shoe of the CAP brake ass'y ❺ directly with your fingers.
- ○ Of the three screws ❷, first fasten screw A temporarily, then fasten screws B and C firmly, followed by screw A.
- ○ The screw fastening torque must be within 3kg•cm ± 1kg•cm.

[Adjustments after mounting]

- ○ Perform tape path adjustments as described in 4-1.

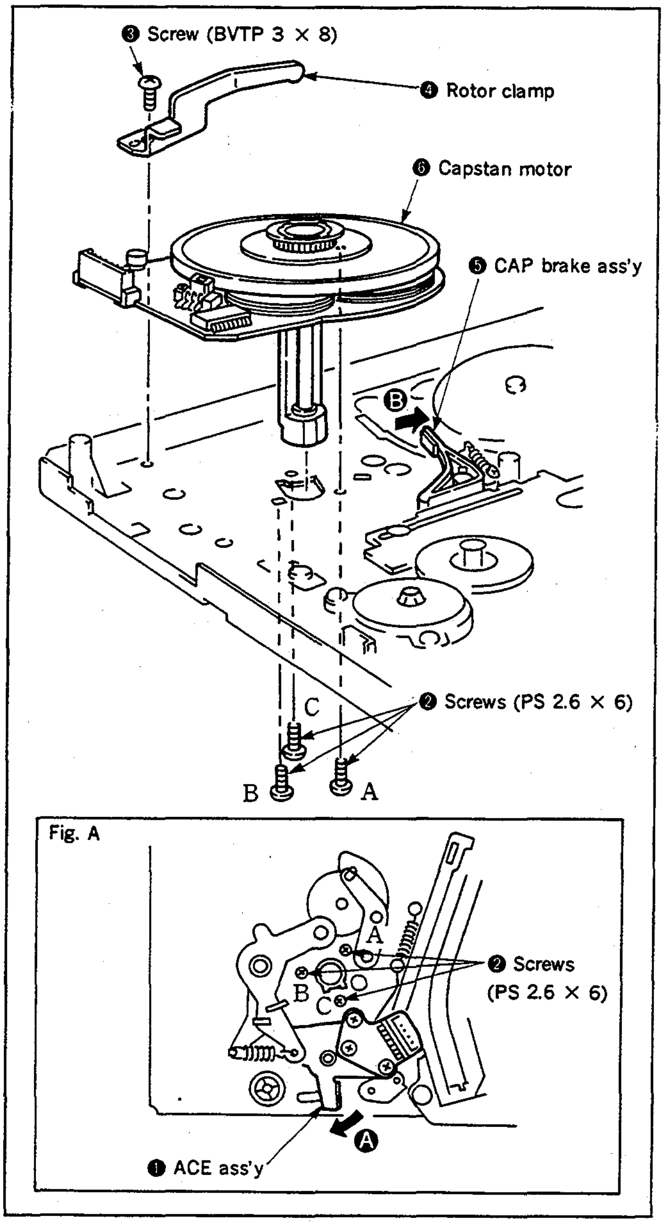

❸ Screw (BVTP 3 × 8)
❹ Rotor clamp
❻ Capstan motor
❺ CAP brake ass'y
Ⓑ
❷ Screws (PS 2.6 × 6)
C
B
A
Fig. A
A
B
C
❷ Screws (PS 2.6 × 6)
❶ ACE ass'y
Ⓐ

Fig. 3-29.

3-24. ROTARY SWITCH (Fig. 3-30)

1) Remove the adjuster arm ass'y. (Refer to 3-21.)
2) Remove the screws ❶ and ❷, then pull out the rotary switch ❸.

[Precautions on remounting]

- ○ Match up the ● mark on the rotary switch ❸ with the ▲ mark on the RKB cam gear ❹ as shown in Fig. A.
- ○ Match up holes ❻ on the pendulum arm ❺ and the chassis.

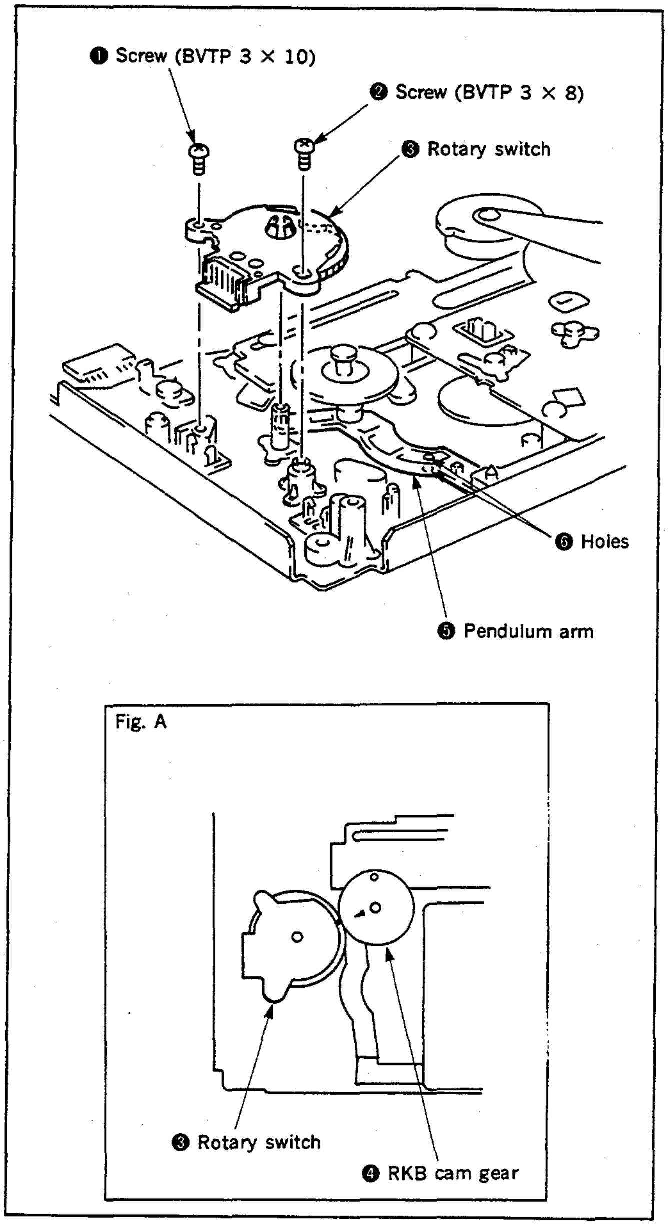

❶ Screw (BVTP 3 × 10)
❷ Screw (BVTP 3 × 8)
❸ Rotary switch
❻ Holes
❺ Pendulum arm
Fig. A
❸ Rotary switch
❹ RKB cam gear

Fig. 3-30.

3-25. RKB CAM GEAR (Fig. 3-31)

1) Remove the adjuster arm ass'y. (Refer to 3-22.)
2) Remove washer 2 ❶, then pull out the RKB cam gear ❷.

[Precautions on remounting]

- When the limiter arm ❸ is pushed in the direction of the arrow, the pin must fit into the notch on the RKB cam gear ❷.
- The ■ mark on rotary switch ❺ must match up with the ◀ mark on the RKB cam gear ❷ as shown in Fig. A.
- Apply 1/2 drop of lubricant to shaft ❻.
- Match up the holes ❹ on the RKB cam gear ❷ and the mode slide plate.

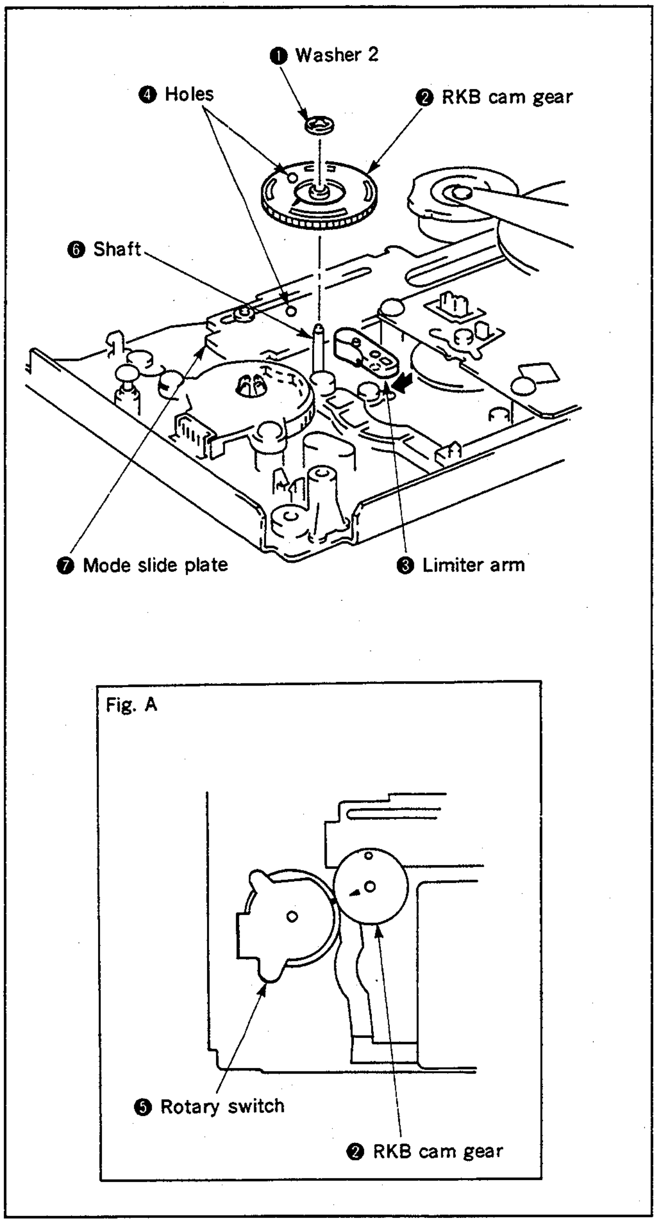

❶ Washer 2
❹ Holes
❷ RKB cam gear
❻ Shaft
❼ Mode slide plate
❸ Limiter arm
Fig. A
❺ Rotary switch
❷ RKB cam gear

Fig. 3-31.

3-26. SUB-CHASSIS ASS'Y (Fig. 3-32)

1) Remove the reel lock release arm and REW gear. (Refer to 3-15.)
2) Remove the pendulum arm ass'y. (Refer to 3-19.)
3) Remove the adjuster arm ass'y. (Refer to 3-22.)
4) Remove the three screws ❶, then remove sub-chassis ass'y ❷.

[Precautions on remounting]

- The switching arm ❸ must be switched in the direction of the arrow.
- The screws must be fastened in order of a, b and c.
- Mount the sub-chassis carefully so as not to damage the gear.
- The corner edge of the lug terminal ❹ must fit into the gap between the chassis ass'y ❷ and mechanism chassis.

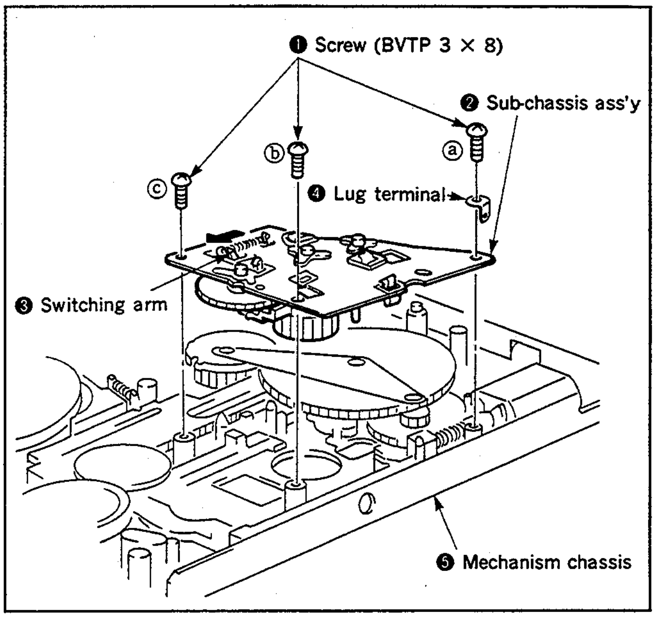

❶ Screw (BVTP 3 × 8)
❷ Sub-chassis ass'y
ⓐ
ⓑ
ⓒ
❹ Lug terminal
❸ Switching arm
❺ Mechanism chassis

Fig. 3-32.

3-27. PENDULUM SLIDE PLATE, PENDULUM ARM (Fig. 3-33)

1) Remove the rotary switch. (Refer to 3-24.)
2) Remove the RKB cam gear. (Refer to 3-25.)
3) Remove the sub-chassis ass'y. (Refer to 3-26.)
4) Disengage the two claws ❶, then pull out the pendulum slide plate ❷.
5) Unhook the spring ❸.
6) Disengage the claw ❹, then pull out pendulum arm ❺.

[Precautions on remounting]

○ The shaft ❻ must fit into hole ❼.

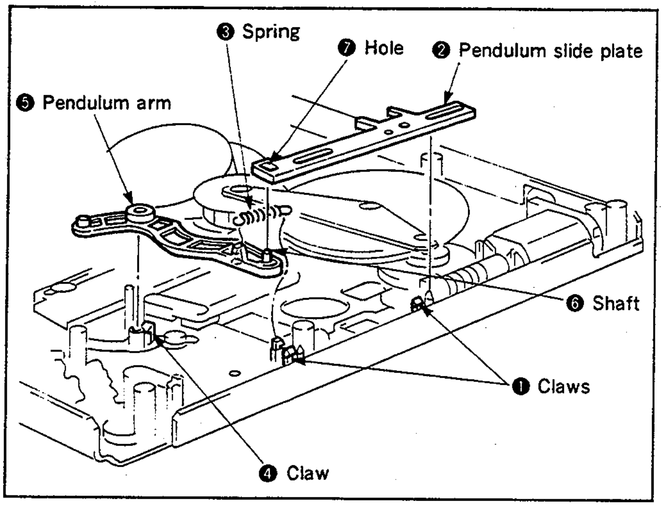

❸ Spring
❼ Hole
❷ Pendulum slide plate
❺ Pendulum arm
❻ Shaft
❶ Claws
❹ Claw

Fig. 3-33.

3-28. THE LIMITER ARM AND LIMITER SLIDE PLATE (Fig, 3-24)

1) Remove the RKB cam gear. (Refer to 3-25.)
2) Remove the sub-chassis. (Refer to Fig. 3-26.)
3) Disengage the claw ❶, then pull out the limiter arm ❷.
4) Disengage the two claws ❸, then pull out the limiter slide plate ❹.

[Precautions on remounting]

○ The shaft ❺ must fit into the hole ❻.

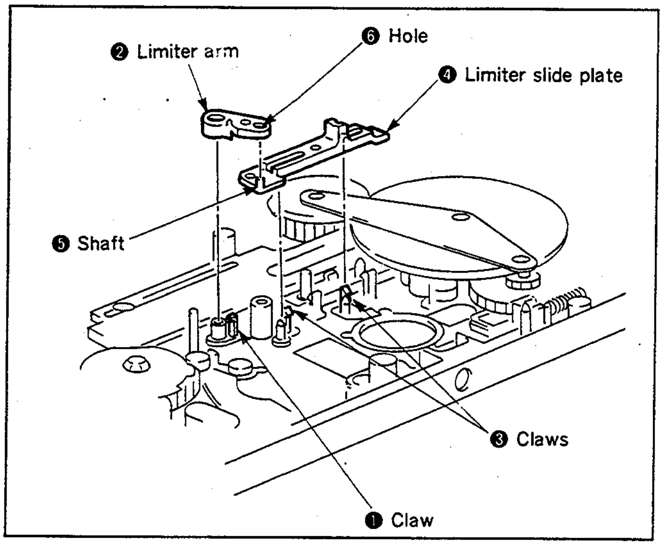

❻ Hole
❷ Limiter arm
❹ Limiter slide plate
❺ Shaft
❸ Claws
❶ Claw

Fig. 3-34.

3-29. CAM MOTOR (Fig. 3-35)

1) Remove the sub- chassis ass'y. (Refer to 3-26.)
2) Disengage the six claws ❶, then remove the cam motor ❷ and worm gear ❸.

[Precautions on remounting]

○ Check the meshing of cam motor ❷ and worm gear ❸.

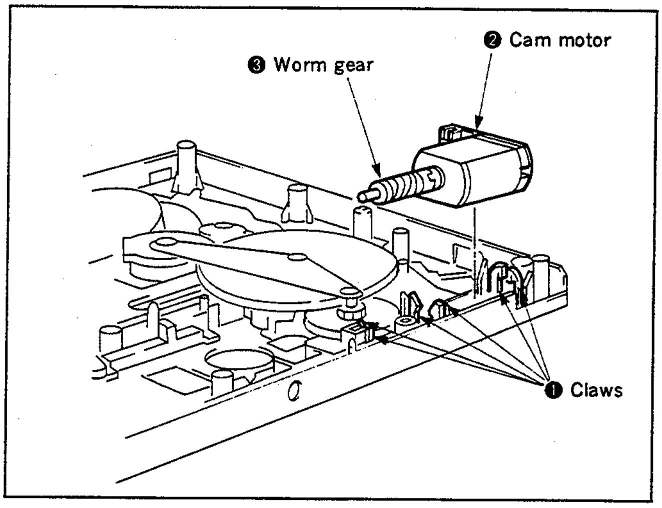

❷ Cam motor
❸ Worm gear
❶ Claws

Fig. 3-35.

3-30. CAM GEAR (Fig. 3-36)

1) Remove the three washers 2 ❶, then pull out the cam gear holder ❷.
2) Pull out the cam gear ❸.

[Precautions on remounting]

○ Match up the right loading gear ass'y, the tension regulator arm, the S take-up arm, the work wheel, the brake arm and the mode slide plate with respective holes ❹ to ❾ on the chassis in that order.

○ Match up the hole ❿ on the mode slide plate with the hole ❿ in cam gear ❸.

○ Apply 1/2 drop of lubricant to the shaft ⓫.

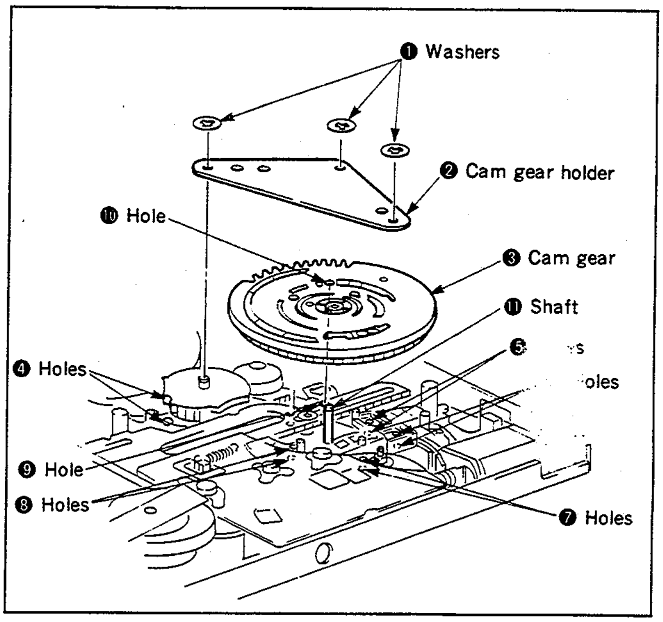

❶ Washers
❷ Cam gear holder
❿ Hole
❸ Cam gear
⓫ Shaft
❺ s
oles
❹ Holes
❾ Hole
❽ Holes
❼ Holes

Fig. 3-36.

3-31. TENSION REGULATOR ARM, S TAKE-UP ARM (Fig. 3-37)

1) Remove the cam gear. (Refer to 3-30)
2) Disengage the claw ❶, then remove the tension regulator arm ❷.
3) Remove the end of the spring ❸ from the S take-up arm ❹.
4) Disengage the claw ❺, then pull out S take-up arm ❹.

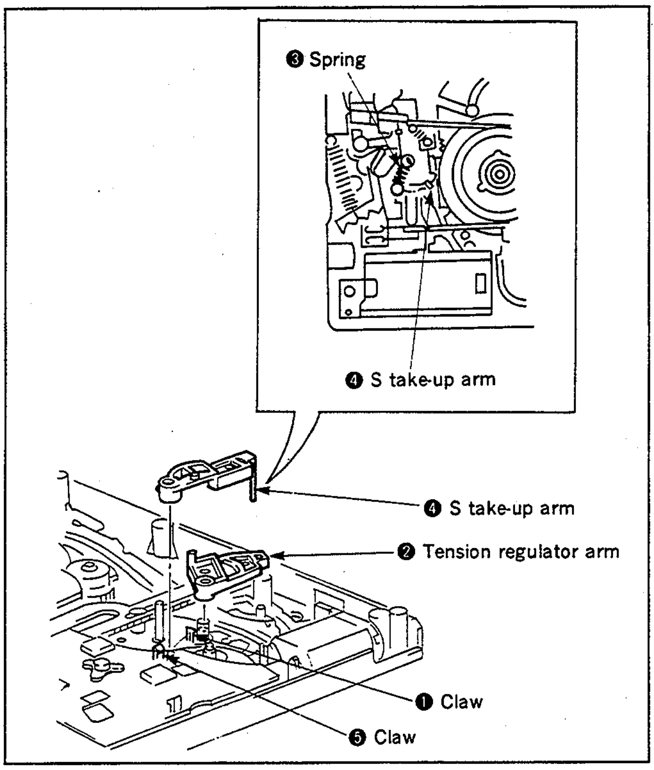

❸ Spring
❹ S take-up arm
❹ S take-up arm
❷ Tension regulator arm
❶ Claw
❺ Claw

Fig. 3-37.

3-32. MODE SLIDE PLATE, RVS RELAY GEAR (Fig. 3-38)

1) Remove the RKB cam gear. (Refer to 3-25.)
2) Remove the cam gear. (Refer to 3-30.)
3) Remove the two washers 2 ❶.
4) Turn the CAP brake ❷ in the direction of the arrow, then pull out mode slide plate ❸.
5) Pull out the RVS relay gear ❹.

[Precautions on remounting]

○ Match up the hole ❺ on the RVS relay gear ❹ with hole ❺ in the chassis.

○ Match up the holes ❻ on the mode slide plate ❸ with holes ❻ in the chassis.

○ Apply 1/2 drop of lubricant to the shaft ❼.

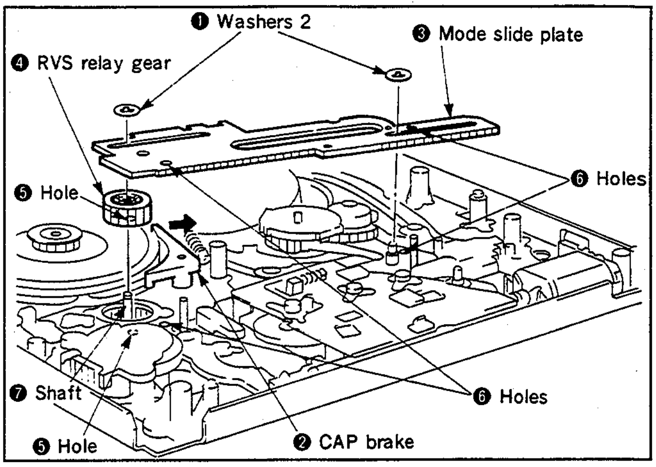

❶ Washers 2
❸ Mode slide plate
❹ RVS relay gear
❺ Hole
❻ Holes
❼ Shaft
❻ Holes
❺ Hole
❷ CAP brake

Fig. 3-38.

3-33. BRAKE ARM, BRAKE SLIDE PLATE (Fig. 3-39)

1) Remove the sub-chassis. (Refer to 3-26.)
2) Remove the cam gear. (Refer to 3-30.)
3) Disengage the claw ❶, then pull out the brake arm ❷.
4) Disengage the two claws ❸, then pull out the brake slide plate ❹.

[Precautions on remounting]

○ Insert the shaft ❺ into hole ❻.

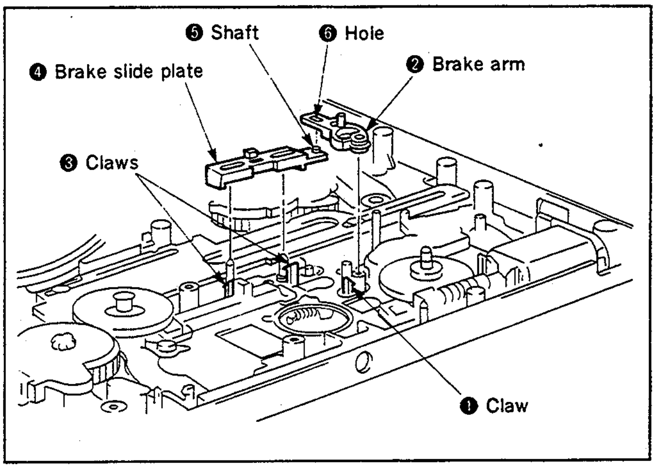

❺ Shaft
❻ Hole
❹ Brake slide plate
❷ Brake arm
❸ Claws
❶ Claw

Fig. 3-39.

3-34. RIGHT SHUTTLE, RIGHT LOADING GEAR ASSY'S (Fig. 3-40)

1) Remove the mode slide plate. (Refer to 3-32.)
2) Remove the plastic slider ❶, then pull out the right shuttle ass'y ❷.
3) Pull out the right loading gear ass'y ❸.

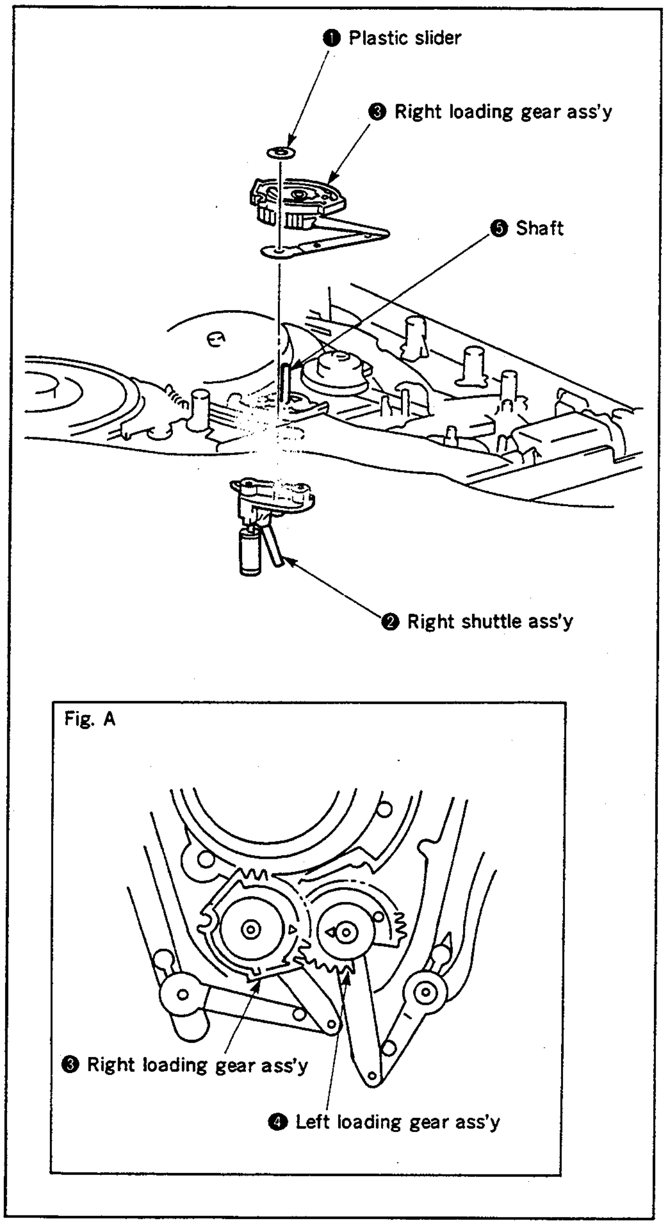
[Precautions on remounting]

○ Match up the ▲ mark on the right loading gear ass'y ❸ with the ▲ mark on the left loading gear ass'y ❹ as shown in Fig. A below.

○ Apply 1/2 drop of lubricant to the shaft ❺.

○ Do not hold on to the arm when pressing on the right loading gear ❸.

○ Clean the section of the right shuttle ass'y ❷ where the tape is attached.



❶ Plastic slider
❸ Right loading gear ass'y
❺ Shaft
❷ Right shuttle ass'y
Fig. A
❸ Right loading gear ass'y
❹ Left loading gear ass'y

Fig. 3-40.

3-35. LEFT SHUTTLE ASS'Y, LEFT LOADING GEAR ASS'Y (Fig. 3-41)

1) Remove the right shuttle ass'y and right loading gear ass'y. (Refer to 3-34.)
2) Remove the plastic slider ❶, then pull out the left shuttle ass'y ❷.
3) Remove washer 2 ❸, then pull out the left loading gear ass'y ❹.

[Precautions on remounting]

○ Apply 1/2 drop of lubricant to shaft ❺.

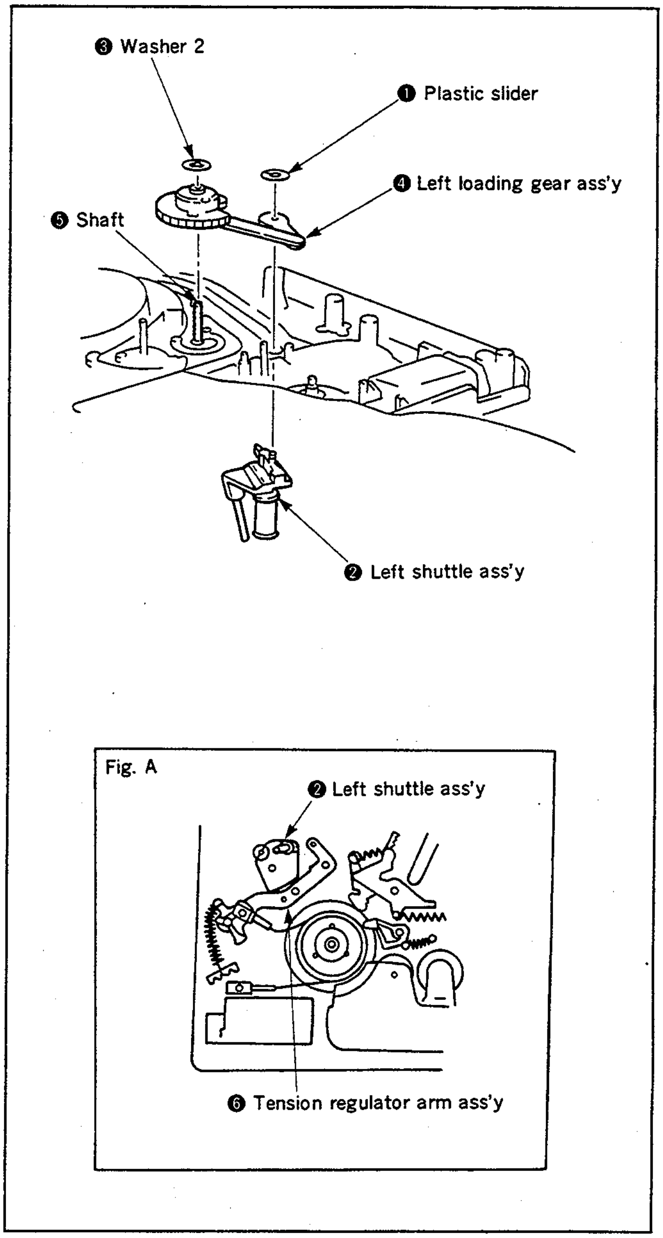
○ The tension regulator arm ass'y ❻ and left shuttle ass'y ❷ must be positioned as shown in Fig. A below.

○ Do not hold on to the arm of the left loading gear ass'y ❹ when the left loading gear ass'y ❹ is pressed.

○ Clean the section of the felt shuttle ass'y ❷ where the tape is attached.

[Adjustments after replacement]

○ Perform tape path adjustments as described in 4-1.



❸ Washer 2
❶ Plastic slider
❹ Left loading gear ass'y
❺ Shaft
❷ Left shuttle ass'y
Fig. A
❷ Left shuttle ass'y
❻ Tension regulator arm ass'y

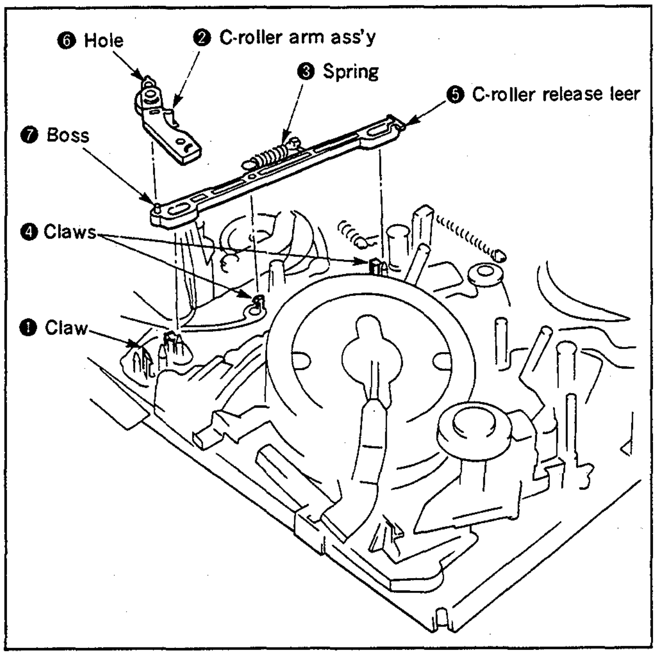
Fig. 3-41.

3-36. C-ROLLER ARM ASS'Y, C-ROLLER RELEASE LEVER (Fig. 3-42)

1) Disengage the claw ❶, then pull out the C-roller arm ass'y ❷.
2) Unhook the end of the spring ❸ from the chassis.
3) Disengage the two claws ❹, then pull out the C-roller release lever ❺.

[Precautions on remounting]

- Mount C-roller arm ass'y ❷ so that the hole ❻ on the C-roller arm ass'y ❷ fits into the boss ❼ on the C-roller release lever ❺.



❻ Hole
❷ C-roller arm ass'y
❸ Spring
❺ C-roller release leer
❼ Boss
❹ Claws
❶ Claw

Fig. 3-42.

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disc via the video heads. Each component part of the tape transport system, particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth.

The tape path system is factory preadjusted. when parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. Tension regulator position/tension adjustment (Fig. 4-1.)

Purpose: Stabilizes contact of the video head and the tape to maintain the tension of the tape so that it feeds at a constant level.

- **Position adjustment**

Mode	Threading is completed without a cassette loaded. (Refer to section 1-2.)
Adjustment locations	Tension band holder

[Adjustment method]

1) Allow the unit to go through the threading procedure without a cassette loaded.
2) Set the VTR unit to playback, then turn the tension band adjuster lever so that the gap between guide No. 0 and tension arm is within 4.5±0.4mm. *(Set the unit to playback without a cassette loaded.)
3) After adjustment, go through the loading procedure once more without a cassette loaded, then check the position of the tension arm.

- **Tension adjustment**

Mode	Playback
Measuring instrument/tool	Torque cassette
Adjustment locations	Position for hooking the tension spring
Specification	28 to 34 g•cm

[Adjustment method]

1) Playback the torque cassette.
2) Check that the center value deviation reading on the torque cassette meets with the standards.
3) When the reading is higher than the standards: Move the spring toward direction Ⓐ.
When the reading is less than the standards: Move the spring toward direction Ⓑ.

Note: Move the spring to the tension spring hook position and recheck the tension arm position. If the arm position is misaligned, adjust the position and tension of the tension arm.

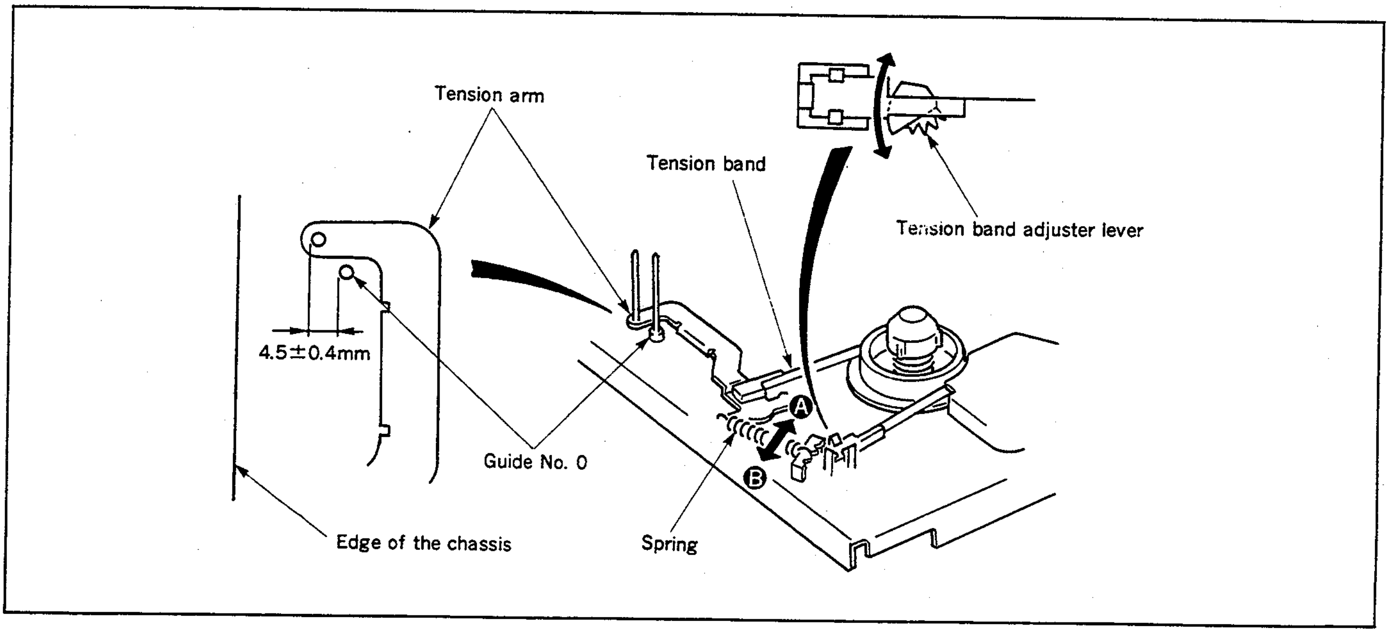


Fig. 4-1.

4-1-2. Height adjustment of the guide roller No. 2 (Fig. 4-2)

Mode	Playback
Tool	Blank tape
Adjustment locations	Guide roller height adjuster screw

[Adjustment method]

1) Load a new tape in the unit, then play it back.
2) Make sure that the lower flange of guide roller No. 2 does not curl up.
3) When the tape curls up: Turn the guide roller adjuster screw clockwise.
   When the tape does not fit into the lower flange: Turn the guide roller adjuster screw counter-clockwise.
4) After the above check, separate the tension arm from the tape, then re-attach it slowly. At this time, check if the tape curls up at the lower flange of the guide roller No. 2 and if the curl disappears within 2 seconds.
5) If curl does not disappear in two seconds: Turn the adjuster screw clockwise.
   If the tape does not curl up: Turn the adjuster screw counter-clockwise.

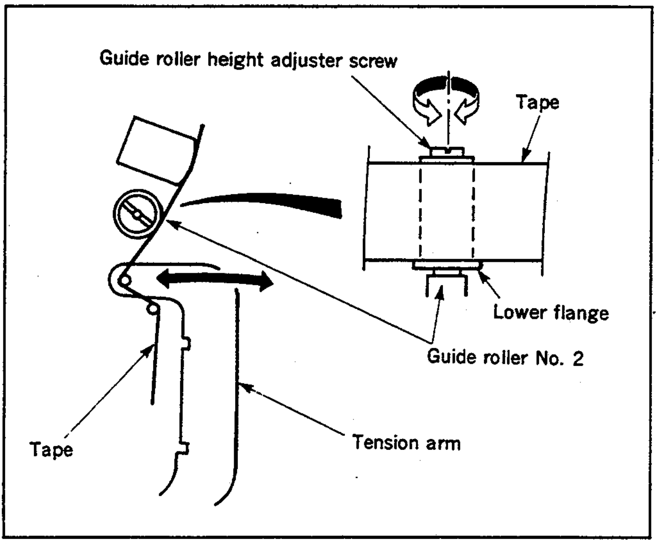


Fig. 4-2.

4-1-3. Height adjustment of guide roller No. 7 and the RVS arm (Fig. 4-3.)

Mode	Playback
Tool	Blank tape
Adjustment locations	Height adjuster nut

[Adjustment method]

1) Load the tape into the VTR and play it back, then adjust the height of the guide roller No. 7 so that the tape runs along the lower flange of guide roller No. 7.
2) If the guide roller is too low: Turn the height adjuster nut counter-clockwise.
   If the guide roller is too high: Turn the height adjuster nut clockwise.
3) Run the tape in REV, then adjust the height of the RVS arm so that the tape runs along guide roller No. 7.
4) If the tape gets caught in the upper flange of guide roller No. 7: Turn the RVS arm height adjuster nut clockwise.
5) If the tape catches on the lower flange of guide roller No. 7 : Turn the RVS arm height adjuster nut counter-clockwise.

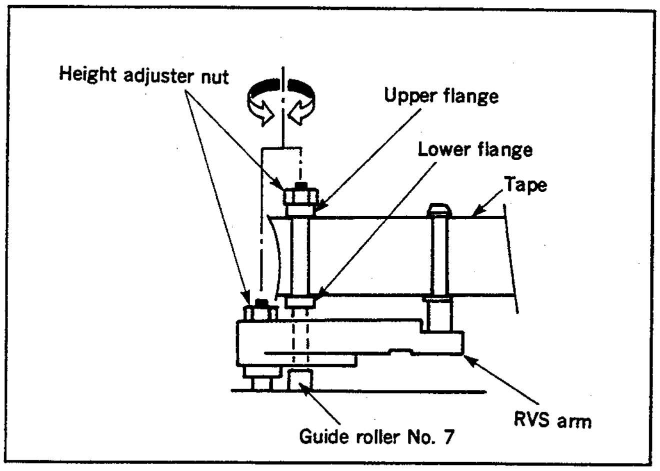


Fig. 4-3.

4-1-4. Height adjustment of guide rollers No. 3 and No. 6 (Fig. 4-4)

Mode	Playback
Signal	Hi-Fi alignment tape (Hi-Fi 400Hz)
Measuring instrument	Oscilloscope
Measuring point	CH-1 : Connector PB RF pin for RF PC board check. CH-2 : Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller height adjuster screw.

[Adjustment method]

1) Tracking (playback) : Turn off the auto tracking, then press the tracking buttons ▽ and △ simultaneously to set the tracking at the center position.
   (If adjustment is made after the drum is replaced, the tracking must be set at the max. Rf output position.)
2) Height adjuster screw: Even out the RF output waveforms.
3) Press the tracking buttons (playback), ▽ and △ alternately.
4) Check that RF output drops the same amount at the front and rear edges.

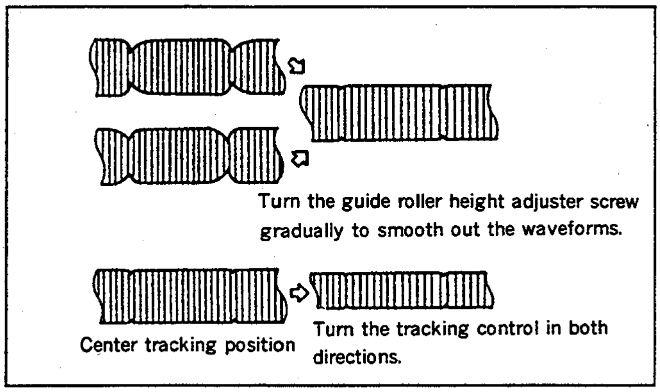

Turn the guide roller height adjuster screw gradually to smooth out the waveforms.
Center tracking position
Turn the tracking control in both directions.

Fig. 4-4.

4-1-5. ACE head ass'y adjustment (rough adjustment) (Figs. 4-5 and 4-6)

Purpose : Allows the tape to make even contact with the head for recording and playback of the specified track.

Mode	Playback
Tool	Blank tape
Adjustment locations	Height adjuster nut, tilt adjuster screw

[Adjustment method]

1) Mount the ACE head ass'y. At this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or raise up noticeably near the ACE head.
4) If the yape curls up or rarises noticeably, readjust the tilt adjuster screw, the azimuth adjuster screw and the height adjuster nut.
   (The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15 mm from the control head.)
5) Perform precision adjustment.

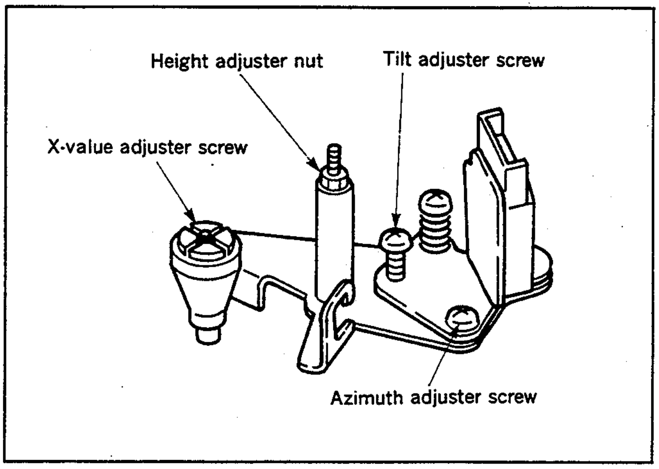

Height adjuster nut
Tilt adjuster screw
X-value adjuster screw
Azimuth adjuster screw

Fig. 4-5.

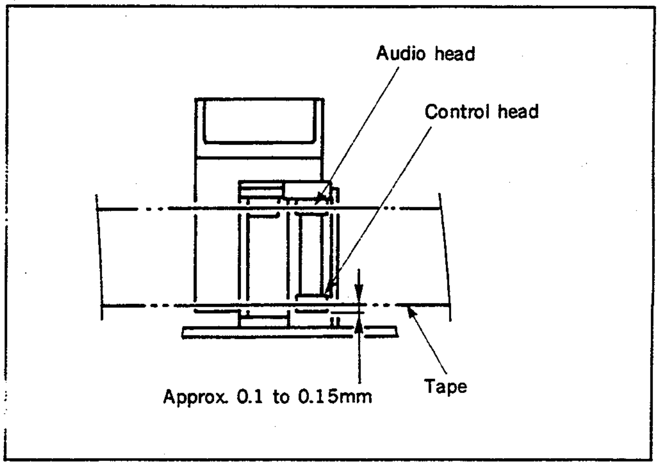

Audio head
Control head
Approx. 0.1 to 0.15mm
Tape

Fig. 4-6.

4-1-6. ACE head assembly adjustment (precision adjustment)

Mode	Playback
Signal	Alignment tape (JVC-MH-1 1KHz)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw Height adjuster nut Tilt adjuster screw

[Adjustment method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or raise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

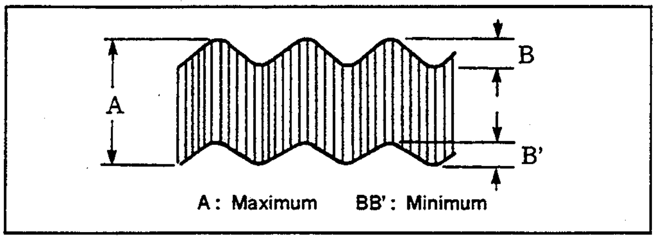

A
B
B'
A: Maximum BB': Minimum

Fig. 4-7.

4-1-7. X-value adjustment

Purpose: To obtain compatibility with other VTR.

Precaution: Be sure to perform the preset tracking adjustment before perform this adjustment. (Refer to the Service Guide.)
Turn off the auto tracking and set the VTR for manual tracking mode.

Mode	Playbadk
Signal	Hi-Fi alignment tape (Hi-Fi 400Hz), alignment tape (JVC-MH-1)
Measuring instrument	Oscilloscope
Measuring point	CH-1: Connector PB RF pin for RF PC board check. CH-2: Connector RF SW P pin for RF PC board check. (Check with the CHA head)
Adjustment locations	X-value adjuster screw

[Adjustment method]

- **Adjustment by Hi-Fi alignment tape**

  When the tracking is set at the center position (by pressing the ▽ and △ keys simultaneously), adjust the RF output to maximum.

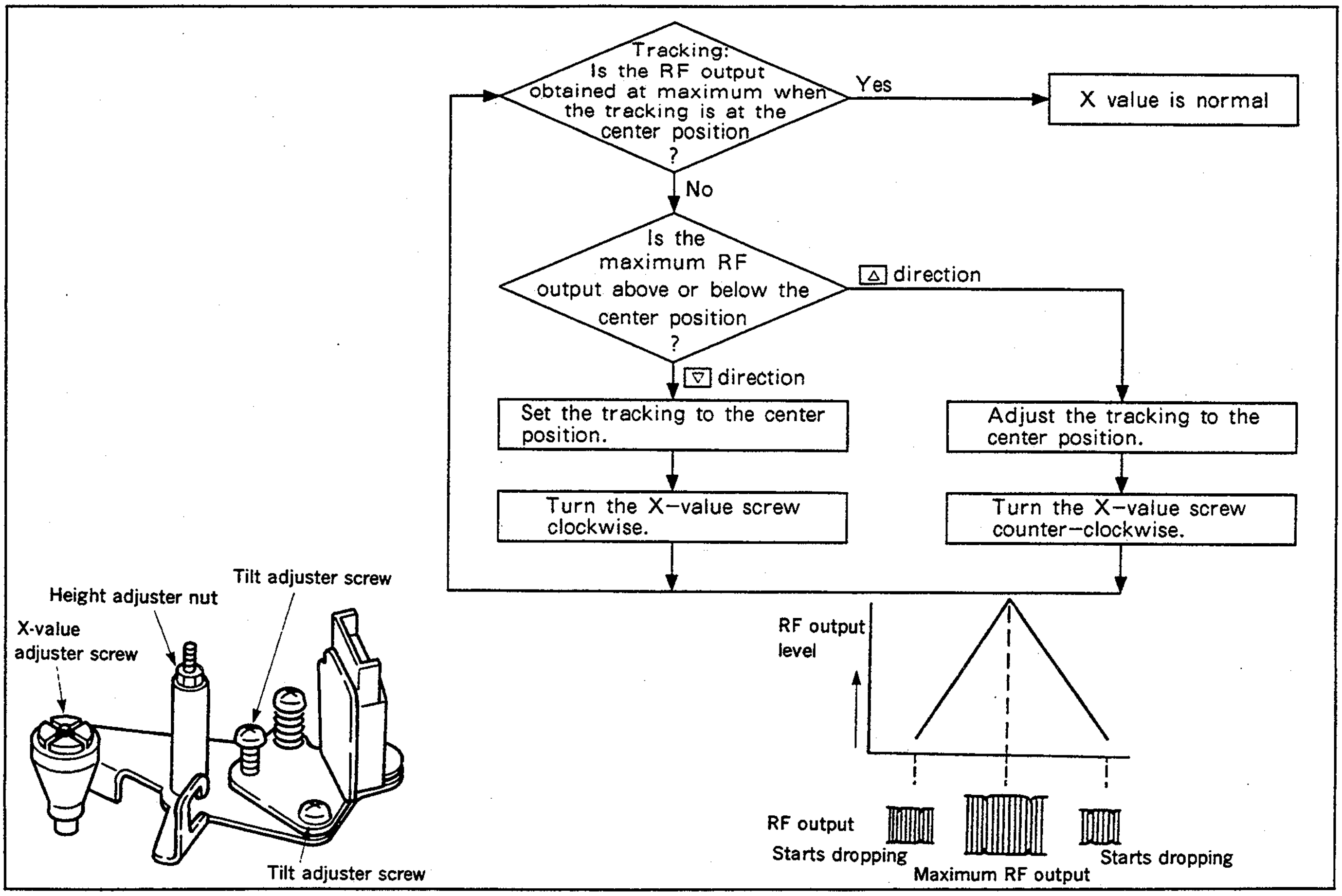

Tracking: Is the RF output obtained at maximum when the tracking is at the center position ?
Yes
X value is normal
No
Is the maximum RF output above or below the center position ?
△ direction
▽ direction
Set the tracking to the center position.
Turn the X-value screw clockwise.
Adjust the tracking to the center position.
Turn the X-value screw counter-clockwise.
Height adjuster nut
Tilt adjuster screw
X-value adjuster screw
Tilt adjuster screw
RF output level
RF output
Starts dropping
Maximum RF output
Starts dropping

Fig. 4-8.

- **Adjustment by Alignment tape (JVC-MH-1)**

  Adjust the X-value adjuster screw so that maximum RF output is obtained and also that the RF output drops to the same position on pressing the respective ▽ and △ buttons while the tracking is set at the center position.

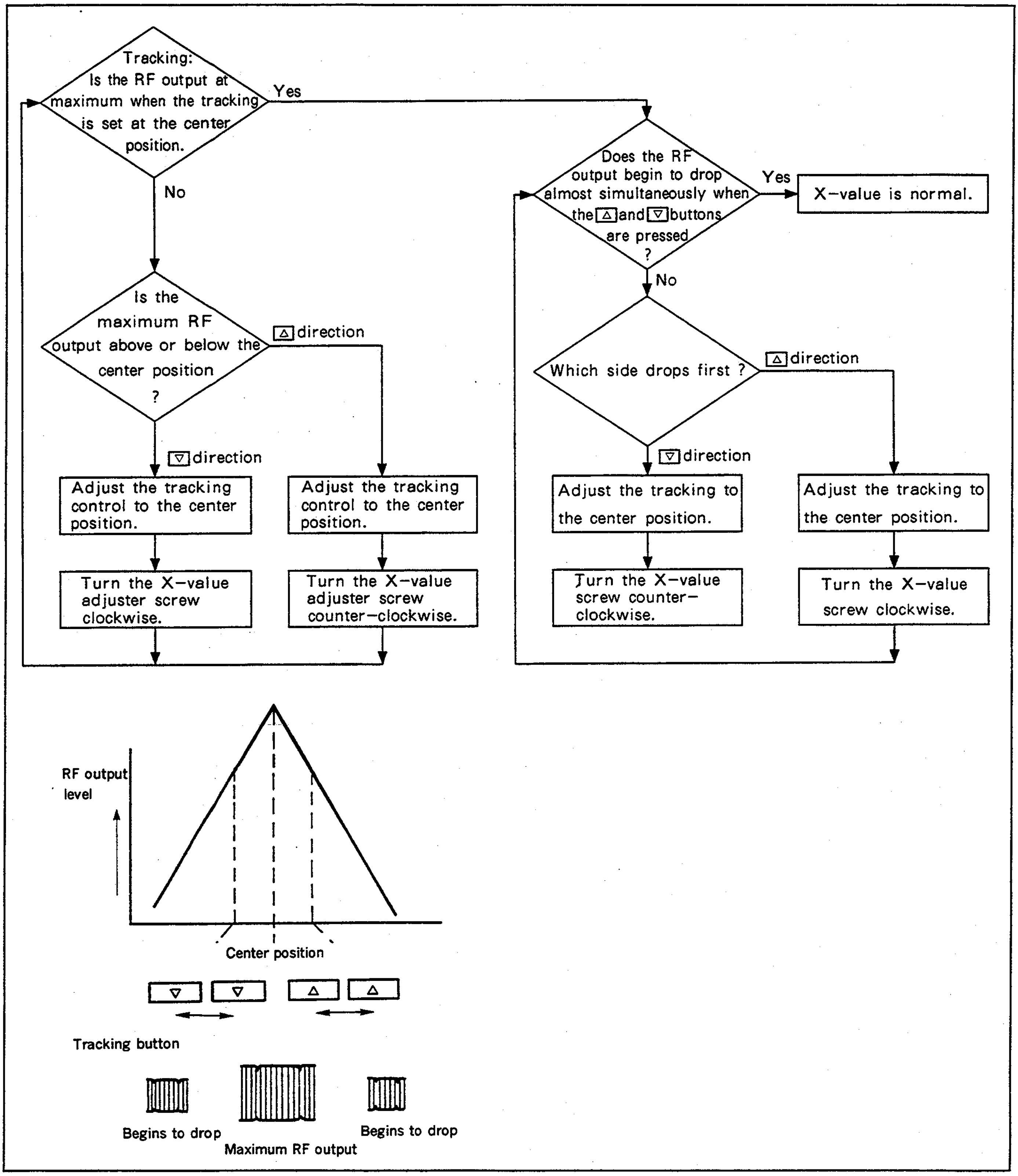

Tracking: Is the RF output at maximum when the tracking is set at the center position.
Yes
No
Is the maximum RF output above or below the center position ?
△ direction
▽ direction
Adjust the tracking control to the center position.
Turn the X-value adjuster screw clockwise.
Adjust the tracking control to the center position.
Turn the X-value adjuster screw counter-clockwise.
Does the RF output begin to drop almost simultaneously when the △ and ▽ buttons are pressed ?
Yes
X-value is normal.
No
Which side drops first ?
△ direction
▽ direction
Adjust the tracking to the center position.
Turn the X-value screw counter-clockwise.
Adjust the tracking to the center position.
Turn the X-value screw clockwise.
RF output level
Center position
▽
▽
△
△
Tracking button
Begins to drop
Maximum RF output
Begins to drop

Fig. 4-9.

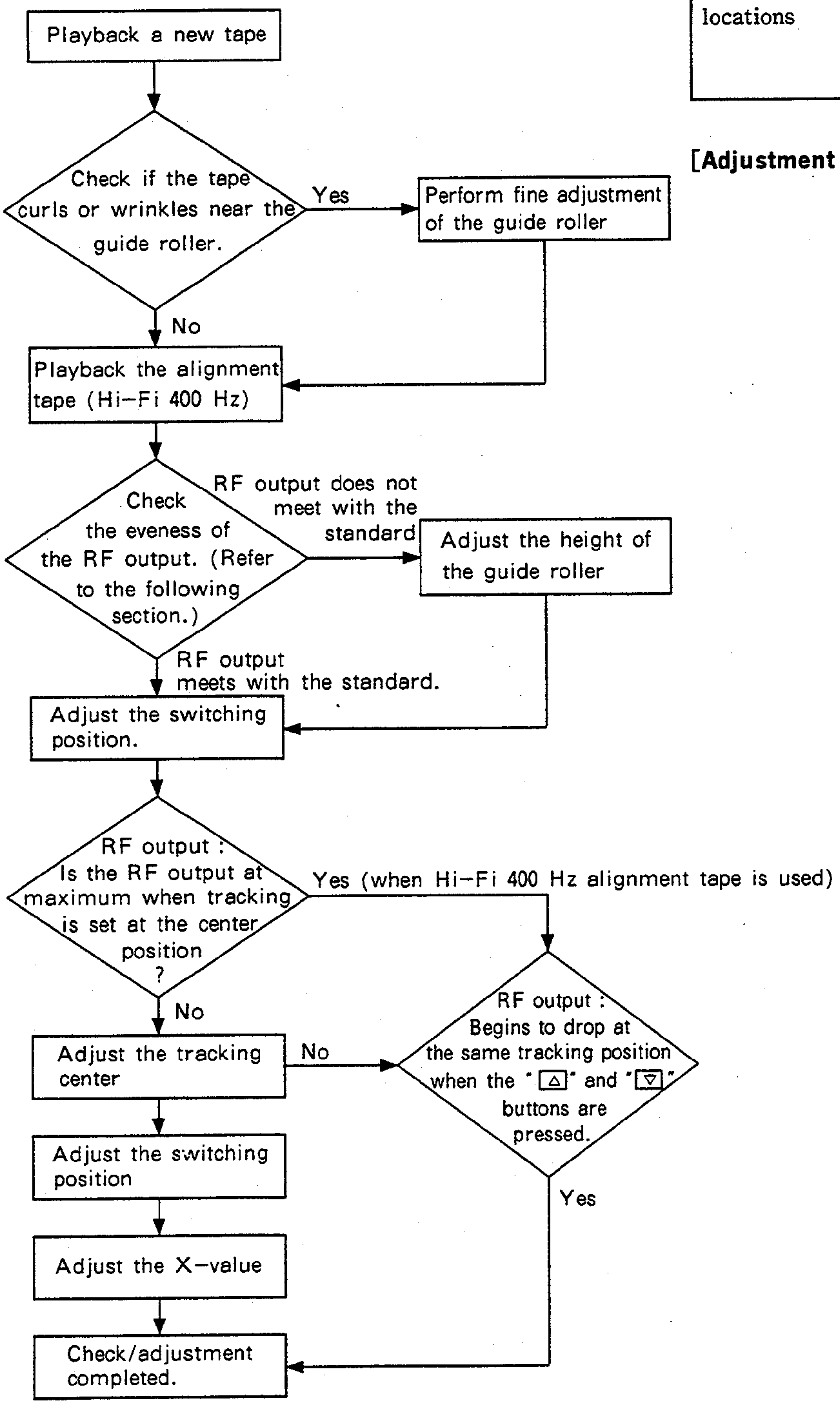
4-1-8. Adjustments after replacing the drum (video head)

Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Precaution: Turn off the auto tracking and set the manual tracking mode.

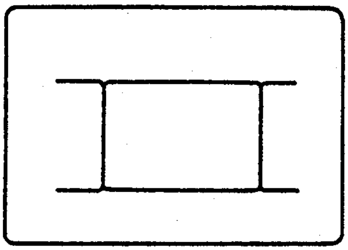
Mode	Playback
Signal	Alignment tape (JVC-MH-1), blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1 : Connector PB RF pin for RF PC board check. CH-2 : Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller (refer to 4-1-5.) Switching position, Tracking preset, SP delay mono-multi, X-value (refer to 4-1-8) } (Refer to the Service Guide)

[Adjustment method]

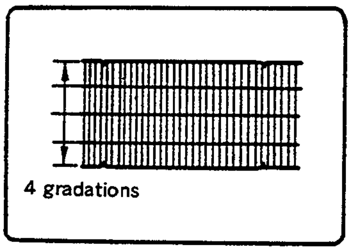

Playback a new tape
Check if the tape curls or wrinkles near the guide roller.
Yes
Perform fine adjustment of the guide roller
No
Playback the alignment tape (Hi-Fi 400 Hz)
Check the eveness of the RF output. (Refer to the following section.)
RF output does not meet with the standard
Adjust the height of the guide roller
RF output meets with the standard.
Adjust the switching position.
RF output : Is the RF output at maximum when tracking is set at the center position ?
Yes (when Hi-Fi 400 Hz alignment tape is used)
No
Adjust the tracking center
No
RF output : Begins to drop at the same tracking position when the "△" and "▽" buttons are pressed.
Yes
Adjust the switching position
Adjust the X-value
Check/adjustment completed.

[Checking the eveness and fluctuation of the RF output]

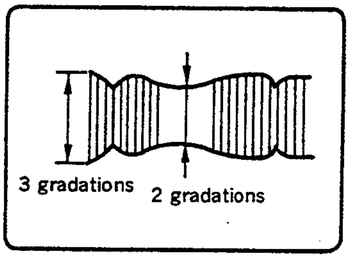
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%.

4-1-9. Checking the tension and torque

Purpose : To check that the tension, torque and compression force of the tape take-up section and mobile sections to ensure smooth tape run and achieve standard VTR performance.
If the tape transport is not smooth or problems occur in relation to the tape transport speed, perform the following check.

Mode	Each operation mode without loading a cassette tape. (Refer to section 1-3.)
Measuring instrument	Torque gauge, Torque gauge adapter

Item	VTR operation mode	Reel to be measured	Measurement value
Main brake torque	Stop	Supply and take-up reels	170g•cm or more
Review torque	Review	Supply reel	180±30g•cm (using the torque cassette)
Take-up torque	Playback	Take-up reel	80 to 140g•cm (using torque cassette)
Back tension torque	Rewind	Take-up reel	4 to 25 g•cm

[Check method]

Measure the torque using the torque gauge and torque gauge adaptor with the torque gauge fixed.

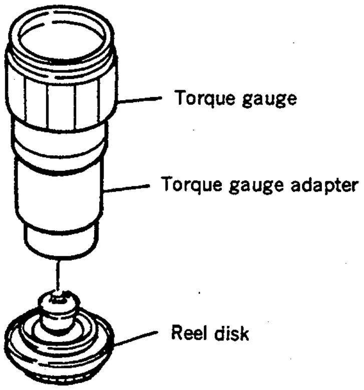


Fig. 4-13.